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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

On Temperate South Africa. By The Right Hon. Sir BARTLE FRERE, Bart., G.C.B., G.C.S.I., &c., late Governor of the Cape Colony, and H.M.'s High Commissioner for South Africa.

(Read at the Evening Meeting, November 22, 1880.)

Map, p. 64.

I PROPOSE this evening to ask the attention of the Fellows of the Royal Geographical Society to the state of our geographical knowledge of the temperate region of South Africa, and to the facilities it offers as a basis of operations for exploring the interior regions of Central Africa, by following the lead indicated by Livingstone in his first journey of exploration.

Strictly speaking, of course, the term "Temperate South Africa" would be taken as including only the extra-tropical portion of the continent; but owing to the elevation of the greater part of the region near the tropic of Capricorn, the temperate region extends north of the tropic, and may be roughly described as bounded to the north by a line starting from the West Coast at about Cape Frio, or the southern limit of the basin of the Cunene or Nourse river, whence following the line of water-parting between the basins of the Cunene river on the one hand, and the affluents of the Zambesi and the waters which fall into Lake Ngami on the other hand, the line would run east and south to the water-parting which separates the basins of the Orange and the Limpopo rivers to the south, from the basin of Lake Ngami and the Zambesi river to the north, continuing in an easterly direction to about 28° of E. long. Thence the boundary of the temperate region trends in a south-easterly direction, through regions not yet fully explored, excluding much of the basin of the Limpopo and its affluents; and when it has reached the southern limit of that basin, follows the line of mountains which join the Drakensberg till they reach Zululand, where the low-lying coast districts about Delagoa Bay may be considered as outside the temperate and within the sub-tropical region.

From Zululand the Indian, and from Cape Frio the Atlantic, Oceans complete the boundaries of Temperate South Africa.

The total region within the boundaries described is about equal to 1,190,000 square miles, that is to say nearly one-third the size of Europe, or six times the size of France.

Within almost the whole of the tract thus bounded the climate and general conditions of human life are such as suit men of European race. They can live, and thrive, and multiply in the manner exemplified by the history of the Dutch and English speaking population of the Cape Colony.

South and west of the line I have indicated I believe that almost everywhere the country is fairly healthy for Europeans, and families of European stock may live as they have always done in the Western province and the Karroo. As the desert and the tropic are approached, the heat is at times excessive, but never, I am assured, so great as to prevent outdoor labour by Europeans.

North and east of the lines I have defined, a malarious fever is met with in all low-lying localities, and especially where the frontier bends southward to the north of Delagoa Bay. Such fever, if not unknown south and west of the line indicated, at any rate does not interfere with the ordinary conditions of healthy existence for men of European stock. North of that line, however, the malarious tracts are sufficiently numerous to be a great practical difficulty in the way of European settlement.

If, again, a second line be drawn in advance of that just described from the Portuguese frontier on the west coast to the Zambesi, and down the Zambesi till the Portuguese settlements are again reached, it will include those tribes which are connected by commerce and occasional intercourse with our South African European colonies. With these further regions between the Limpopo and the Zambesi the white settlers of the Transvaal and other South African European colonies have already considerable commercial relations, but except a few traders and missionaries there are no European settlers.

Let us now consider what European colonies or States under European rule actually exist south of the first-mentioned line. The following table enumerates them, with their area and population, according to the latest returns:—

Colonies or States.	Area, Square Miles.	Population.
Under the Cape Parliament and Responsible Government.		
Cape Colony Proper	199,000	720,984 *
Basutoland	10,293	127,707 natives. 469 Europeans.†
Kaffraria, Griqualand East, and Pondoland	20,000	285,000
Natal	21,150	22,650 whites. 290,000 native Africans. 12,900 Coolies.
Transvaal	114,360	260,000 natives (about). 40,000 whites ‡ „
Orange Free State	42,470	25,000 white. 25,000 coloured.†
Griqualand West	16,630	32,940 „ 12,337 white.
Disputed Territory (Keate's Award) ..	7,000	12,000

All these are now within the limits of British territory, between the sea, the Orange River, and the Limpopo, and (with the exception of the Orange Free State) are more or less under the government of the British crown.

Beyond the limits of British territory and south of the Portuguese boundary on the east coast are

Countries.	Area, Square Miles.	Population.
Zululand	100,000	250,000
Tongas	4,400	20,000
Swazis	4,400	40,000

All the above countries, provinces, and colonies are within the area habitable by Europeans as colonists.

North of the Limpopo and south of the Zambesi are a number of native States imperfectly known to our officials, but constantly visited by traders—chiefly English—and a few missionaries, through whom there is much occasional intercourse with these states, sufficient to give to each party some idea of the resources and disposition of the other. The Matabele, the principal of these tribes, were a very barbarous branch of

---

* Cape Colony Census, 1875:—

Europeans or whites	236,783
Malays	10,817
Hottentots	98,561
Fingoes	73,506
Kaffirs or Bechuanas	214,133
Mixed and others	87,184
Total	720,984

† In 1875.

‡ A much larger estimate of the population of the Transvaal is given in the Report of Mr. Henrique Shepstone at p. 16 of Parliamentary Bluebook C, 2584:—

Natives		774,930 souls.
Europeans:—		
Dutch	33,739	
Others	5,316	
		39,055 „
		813,985 „

NOTE.—It may give to popular apprehension a better idea of these areas to say that the Cape Colony is nearly equal in size to France, and nearly double the old kingdom of Prussia; that Basutoland is about the size of the kingdom of Greece; that Kaffraria and Natal are each about double the size of Greece; that the Transvaal is a little smaller than the British Isles; and the Orange Free State a little larger than the old kingdom of the two Sicilies, or about four times the size of Greece.

the Zulus who revolted and left Zululand about fifty years ago, and being headed back by the Trek-Boers then travelling northwards, and checked on the west in their destructive raids on the more civilised but less warlike Bechuanas, turned to the north-east, and finally settled far north of the Limpopo, under Moselikatze, the father of Lobengula, the present chief. They were visited, when Moselikatze was in the neighbourhood of the Rustenburg district of the Transvaal, by Captain (afterwards Sir William) Harris, an accomplished officer of the Bombay Engineers, who was hunting in their country rather more than forty years ago. He gives a vivid and most interesting picture of their barbarous condition, and the character of the chief and people, at that time.

The only material changes which have taken place since then among the Matabele, are due to the action of the missionaries and traders who have visited them, or settled at the capital. Eastward of the Matabele the influence of the Portuguese traders, and of the active slave trade, is more felt.

The following is Mr. A. A. Anderson's estimate of the area and population of the countries north of British territory up to the Zambesi. Mr. Anderson has visited most of these countries, and the areas are generally given, with some approach to correctness, from the map; but the estimate of population is apparently a calculation from the area, of so many souls, generally one to every two square miles.

Countries.	Area. Square Miles.	Population.
1. Matabele (Zulus)	100,000	Thickly populated.
2. Mashona		
3. Makalaka (Lobengula's)		
4. Makombe, east of Mashona ..	40,000	Large and industrious population.
5. Gasa Country, Umzila's, &c. ..	70,000	Portions thickly populated, and people industrious.
6. About Lake Ngami, under Moremi, son of Leshulatebe, whose capital is on the east side of the Lake and River Zouga	40,000	20,000
7. Ovampoland	60,000	30,000
8. Damaraland	100,000	84,000
9. Great Namaqualand	70,000	20,000
10. Bamangwato (Khama)	70,000	45,000
11. Molopolole (Sechele)	30,000	45,000 (exclusive of Bushmen, Dr. Holub says 30,000).
12. Also two chiefs, with an independent following of chief Gaseitsive (Khatsitsive of Holub); chief town Kanya	60,000	35,000
Chief Montsioa	20,000	15,000 (Holub says 30,000).
13. Petty tribes, north of Griqualand West	30,000	20,000
14. Kalahari Desert, 600 miles long by 200 to 400 broad	260,000	
15. Desert of Orange River	20,000	
Total from British Colonies, up to 16° S. lat.	970,000	

I may here add, for the sake of reference, the following estimate taken from Captain Harrel's Report, 17th of April, 1880, on the Cis-Molapo tribes, i. e. those residing between the Molapo and the Vaal rivers.

Tribes.	Chiefs.	Chief Towns.	Population.
Barolong	Montsioa	Schuba	12,500
"	Moroquane	Moroquane	10,000
"	Makobi	Pitsani	2,500
"	Mathlabi	Polfontein	5,000
Batlaro	Bareki	Koningvley	10,000
Batlapin	Mankuruane	Taung	12,500
Mari Batlapin	Mathlabane	Monte and Bkwani	7,500
Korannas and Batsatsing	Massouw	Mamusa	5,000
		say	60,000

All these estimates, it will be seen, are conjectural; but at present none more accurate are procurable.

The Damaras (No. 8 on the list) and the broken tribes of Great Namaqualand (No. 9) have been well described by Mr. Francis Galton, Andersson the Swedish traveller, and more recently and fully by Mr. Coates Palgrave. All the leading clans have, for various reasons, sought to place themselves more or less under the protection of the British Government; but none have been directly received as subjects, though a Resident has been appointed to use his good offices in keeping the peace in Damaraland, and as magistrate at Walvisch Bay. Through that port, and such smaller landing-places as Angra Pequena, much British, Norwegian, and German trade under the British flag is carried on; whilst many missionaries, chiefly German and Norwegian, with a few English, French, and Finns, have devoted themselves to Christianise and civilise the Namaquas and Damaras.

On the eastern side of the Kalahari, so-called, desert, the tribes of Bechuanas, Batlapins, and others, entered as Nos. 10 to 13 on the list, are in a state of civilisation far more advanced than any other in South Africa; and through the agency of the missionaries of the London and other missionary societies, the companions and successors of Livingstone and Moffat, much progress has been made in Christianising them.

The Christian chief, Khama of Bamangwato, rules over the most prosperous and powerful of these tribes in a manner which would do honour to any sovereign in Europe. He is much amenable to the influence of the British Government in the Transvaal, to which he is inclined to look for aid should he ever require support against his aggressive and barbarous neighbours, the Matabele. He is, however, entirely independent, whilst all the chiefs to the south of his country down to the border of Griqualand West are in a transition state, nominally independent, but unable to resist either external aggression or domestic lawlessness without some aid from their European neighbours. The responsibility for giving such aid has never been acknowledged by the British Government; but the old chiefships have fallen into decay, and the question of what shall be substituted for them must before long be faced by the Governments interested in the peace of those regions, namely the Governments of Transvaal and Griqualand West, and in a less degree those of the Orange Free State and Cape Colony.

The annexed map, from a sketch by Lieutenant Elphinstone Dalrymple, shows the relative position of all the colonies and tribes (comprised within what may be termed Temperate South Africa) referred to.

Two lines drawn from Cape Town show by the scale of miles and the names written on them the distances in a direct line from London of many of the best known European capitals and great cities, and give by comparison a better idea than mere figures of the vast area of South Africa, and the enormous distances apart of the chief centres of commerce and population.

To recapitulate: In that portion of South Africa, which is suited for colonisation and continuous residence by men of European extraction, there are five European colonies and States:—1. Cape Colony; 2. Natal; 3. Transvaal; 4. Orange Free State; 5. Griqualand West. They have an aggregate area of 393,610 square miles—a little less than double the area of France—and an aggregate population of about 336,770 of European extraction, and about 1,105,041 of coloured races, for the most part natives of Africa.

The rest of the tract comprises an area of about double the size of the five European colonies and States, and probably not less than double their population, which is, with comparatively very trifling exceptions, entirely of native race, and independent of Colonial or European government.

To obtain a better idea of the general surface configuration of this area, attention should first be directed to the great river basins, especially that of the Orange River, which geologists tell us must have been a vast inland sea, till it was drained by some great convulsion of nature which opened the gap on the mountains of the West Coast through which the Orange River now takes its course to the Atlantic. The western, the southern, and the eastern limits of this basin are formed by wide mountain ranges, which, rising in successive terraces from the Atlantic and Indian oceans to a height of from 4000 to 5500 feet, are known by various names at different parts of their course, till the Drakensberg rises to its highest peaks, estimated at about 10,000 feet, near the point where the boundaries of Natal, Basutoland, and the Orange Free State meet. The "Mont aux Sources," as it was named by the French missionaries, is generally held to be the highest point in the whole range, and close to it are the sources of many rivers—some, such as the Orange River and its tributaries, flowing in a north-west or west direction to the Atlantic; others, like the Tugela, flowing to the east coast.

I may here remind the Society that the Tugela, rising on the north face of this great mountain range, throws itself almost at one leap down 2000 feet to the valleys of Natal below. There are actually, I am told, three falls, though they appear as one, till the spectator is quite close, and the volume of water in the rainy season is very great. These falls have been very little visited, though they are to be reached from either side of the mountains without any serious difficulty or danger.

I would now say a few words on the extent to which the information recorded on our best maps may be considered as fairly accurate.

First, as regards the coast-line.

The coast from the mouth of the Orange River round the Cape Peninsula to the mouth of the Tugela has been surveyed at various times with sufficient accuracy for all purposes of ocean navigation, and the Cape Colony has in Mr. Skene, the Port officer of Port Elizabeth, and Captain May, R.N., nautical surveyors distinguished for their industry and the accuracy of their work. Captain May is constantly employed in surveying harbours and estuaries, completing and extending older surveys, and in other work within the Cape Colony, which is especially useful to local coasting trade.

But north of the Orange River on the west coast, and north of the Tugela on the east, the general coast-line has been laid down only from a running survey executed for the most part more than half a century ago, with partial surveys of more recent date and a more complete character, of particular portions, such as Walvisch Bay and the Guano Islands on the west coast, and Delagoa Bay on the east.

It is no disparagement of the marvellous industry and admirable work of Captain Owen and his fellow labourers, to say that their survey is by no means adequate to the wants of modern commerce.

The Indiamen and men-of-war of fifty years ago had little business near the coast, except in making Table Bay, Simon's Bay, or Algoa Bay, and Owen's running survey was generally sufficient for their purposes; but the great development of coasting steam traffic renders much more accurate and detailed surveys essential to prevent a frequent recurrence of accidents, such as have occurred, not only to coasting steamers, but to men-of-war, like H.M.S. *Boadicea* and *Tenedos*, which in the Zulu war narrowly escaped shipwreck on an unmarked shoal.

I am convinced that there are few things in the power of Her Majesty's Government, which would do more to promote and develop commerce on those coasts, than a careful detailed survey, by a vessel continuously employed for the purpose, assisted by a party travelling by land along the beach.

The expense of such operations, as compared with the security they would afford against the wreck of valuable vessels, would be very trifling; and, as the subject has, I see, already attracted much notice, I would respectfully suggest that the Royal Geographical Society would not be going beyond the usual sphere of its action, in adding the weight of its influence with Her Majesty's Government, to ensure the complete and thorough survey of both the east and west coasts of South Africa.

As regards the territorial survey of South Africa there is a yet larger field open for geographical and topographical research. Of the whole area on the map before us, the only portion as yet surveyed with any pretensions to scientific accuracy is a coast series of triangulation from a point 150 miles south of the mouth of the Orange River to Cape Agulhas, which was surveyed under the direction of the late Sir Thomas Maclear, and a similar coast series continued under the direction of Captain Bailey, extending from where Maclear's series ends to the Kei river, which was then the frontier of the colony. This latter series is less perfect owing to the loss of some of the data by shipwreck; but it is quite sufficiently accurate for all practical purposes.

But beyond these series, which nowhere extend more than 100 miles from the coast, there is nothing like an accurate foundation for surveying operations, and indeed throughout the Cape Colony, the Orange Free State, and the Transvaal, the existing system of surveys is incompatible with scientific accuracy, as it is entirely synthetical, effected by piecing together detached surveys of estates without a previous foundation of accurate triangulation.

With a view to provide a more accurate basis for the surveys required in almost all departments of the Government, I invoked the aid of Sir Thomas Maclear's accomplished successor, Mr. David Gill, who is now the Astronomer in charge of the Royal Observatory, near Cape Town; and the Bluebook, of which I have now the honour to present a copy to the Royal Geographical Society, gives an abstract of Mr. Gill's proposals for continuing the trigonometrical survey in the Cape Colony and adjoining territories.

I feel assured that Mr. Gill's proposals will secure the hearty concurrence of all scientific geographers; and here again I feel sure that the legitimate influence of the Royal Geographical Society with Her Majesty's Government will not be exercised in vain, if the Council of the Society should see its way to bring to the notice of Her Majesty's Government the inestimable economical value of a sound scientific basis for all local surveys, which can only be afforded by such a system of triangulation as Mr. Gill suggests.

Let us turn now to other agencies for extending our geographical knowledge of these regions.

We have, I think, a very imperfect idea of the extent of missionary agency at work beyond the British boundary, and every mission station is of course a point where much accurate geographical information is obtainable regarding the neighbouring country, and often for a long distance ahead, towards the less known interior.

Whilst in South Africa I obtained returns of most of these stations, of which the following is a summary:—

The Church of England sent returns of fourteen stations, generally near the border, but some from 100 to 150 miles inland, chiefly in Kaffraria and Zululand. There are seventy-one European agents at work, with several out-stations.

The Church of Rome has three stations in Damaraland and the Tati and Matabele districts, about 130 miles north of the Limpopo; sixteen European agents chiefly connected with the orders of the Jesuits and of the Holy Ghost. One of the former, Father Law, has already contributed some valuable notes on the geography of Matabeleland.

The Dutch Reformed Church has three permanent stations with three out-stations, under fourteen European agents. Two of these stations are beyond the border of Transvaal, and one in Great Namaqualand.

The Wesleyan Church has sixteen stations beyond the colonial border, most of them in Kaffraria Transkei. There are sixty-five European agents, and many out-stations.

The London Missionary Society has eleven stations beyond the British frontier, chiefly in Bechuanaland, with twelve European missionaries, who are working in the field which was occupied by Moffat and Livingstone. The nearest station is 700 miles from Cape Town, and the furthest 1600.

The Rhenish Mission has twenty-one stations in Great Namaqualand and Damaraland. The stations are from two to forty days' journey beyond the Orange River, the day's journey being reckoned at from six to eight hours a day travelling by ox waggon, say from 18 to 26 miles. These stations employ 200 Europeans, missionaries and agents of various kinds. Nine of the stations are amongst the Herero Damaras, four among Nama Bastards, and the rest among Namas of pure blood.

The Royal Geographical Society is aware how much we already owe to members of this mission for our knowledge of Damaraland, and it is unnecessary to point out what a good position these missions occupy, for collecting geographical data regarding the regions north and north-east of Damaraland.

The Finnish Missionary Society has four stations in Damaraland, with four European agents. I may mention that the reason given to me for the attention of these missionaries being first directed to South Africa was the belief of some Finnish philologists that the language of the Namas and Bushmen belonged to the same family of languages as some of the less known languages of Northern Europe and Asia.

The three stations of the Scotch Church and Free Church Missions on Lake Nyassa, so well known to the Royal Geographical Society, and so flourishing, employing thirty-one European agents, are classed by their brethren at the Cape as belonging to South Africa; but I think we must limit ourselves to the regions south of the Zambesi.

The Berlin Missionary Society has two stations, and the Moravian Church four, beyond the Orange River. The missions of the latter Church to the Hottentots and Namaquas are, I believe, among the oldest and most efficient in South Africa.

The French Protestant Missions have three stations, employing seven agents in Trans-Gariep. This does not, I believe, include the mission of the Rev. Mr. Coillard, who started from Basutoland with the intention of establishing a mission beyond the north-eastern frontier of the Matabele country; but not having succeeded in getting permission from Lobengula, the king of the Matabele, he finally selected a site not far from the Victoria Falls on the Zambesi, which will probably become an advanced point of geographical as well as of missionary work in that direction.

In all there are about eighty-four fixed stations of various missionary societies, with more than that number of out-stations, manned by some 412 European teachers of various classes—beyond the British frontier. These missions belong, as we have seen, to almost every branch of the Christian Church. The Church of England, the Church of Rome, the Dutch Reformed Church, the Wesleyans, the London Missionary Society, the German Rhenish Mission, the Finnish Missionary Society, the Free Church of Scotland, the Berlin Missionary Society, the Moravian Church, the French Protestant Missions—eleven societies in all.

When it is considered that each of the agents employed by these societies is a man of some education, and often a man of the highest culture and great intellectual power—that most of them have some, and many a most intimate, knowledge of the native languages, and all are in the course of their duty constantly in communication with natives of all classes—it will be apparent what an enormous agency for geographical and other scientific discovery is available in the missions beyond our border, and I have every hope that under the direction of my friend Mr. David Gill, the resuscitated South African Philosophical Society, originally founded by his great predecessors, Sir John Herschel and Sir Thomas Maclear, and of which he is President, will make good use of such opportunities.

Let me now say a few words on the machinery for geographical and other discovery available in the great body of traders, who are extending lines of commerce hundreds of miles beyond the British frontier.

I do not now refer to the "Smouzer" or "Winkler," the pedlar on a large or small scale, who drives a small trade without generally going very far afield; I refer rather to the trader who embarks a considerable capital in one or more 12-ox waggons, and who generally travels with a party of at least one companion of European descent, with several native servants as driver, fore-looper, and hunters, or other helpers, sometimes, where game is plentiful, mustering a considerable number of guns. The amount of capital thus embarked is very considerable. I have been assured, on apparently good authority, that one Swedish house in Cape Town turned over annually a capital of 200,000*l.*, almost entirely employed in territories north of the Orange River beyond the British border.

One of the members of such a firm told me that they employed sixty waggons, to each of which one, and sometimes two Europeans were attached, with from twelve to sixteen oxen to each waggon, and sometimes in the more distant expeditions, the hunting party of one waggon alone consisted of as many as sixty natives armed with guns. This was in Damaraland and in countries to the north of it, on the west coast, of which I am now more particularly speaking. A considerable discretion is allowed to the trader in charge of the waggon, who generally directs his course to regions where he hears that game, especially elephants, are plentiful, and, besides what he shoots himself, he purchases from the natives, ivory, ostrich feathers, the more costly horns and skins, carosses or fur rugs, &c., and generally does not return until his waggon, carrying about four tons, is well filled. It is to be remembered that the oxen graze where they travel, and rarely get artificial food of any kind; that the party depends for its subsistence on the game they shoot, and flour or porridge of Indian corn; that worn-out clothing is usually replaced with improvised leather; so that, as long as the waggons hold together and the oxen do not die, the trader can travel on wherever he can get permission from the native chiefs, and is not tied to time or to any particular route.

I think I mentioned in a former communication to the Royal Geographical Society the instance of Mr. Thomas, an American trader, who believed he had penetrated as far as lat. 14° in the country at the back of the Portuguese possessions on the west coast.

But though the man in charge of a trader's waggon habitually selects the least known and least frequented tracts, it is rather difficult to obtain from him the results of his observations. He has rarely much scientific education, and sometimes little, if any, beyond the ability to read and write English or Dutch; still more rarely has he instruments, and after his day's trek is finished, he is well tired before he gets to sleep. Should he be better qualified by education and natural ability for observation, he is bound by self-interest or the injunctions of his employer to keep his knowledge to himself; and while there is much game in the country it would be suicidal policy to boast of his hunting exploits or geographical discoveries.

I speak now mainly of the hired servants of the head traders. The traders themselves are often men of education, who take a pride in giving aid to the scientific explorer or inquirer. But they have other things to do beside writing books of travels, and he who would learn from them, must go amongst them, and draw on their stores of knowledge by personal communication.

The traders into the Zambesi basin generally are connected with firms in the eastern parts of the Cape Colony and Natal, and have little to do with those who frequent Damaraland and the west of the Kalahari Desert. I met several of the Zambesi traders who were men well qualified to contribute largely to our stores of African geographical and scientific knowledge. Some of them, such as Mr. Selous and Mr. A. Anderson, have contributed valuable papers to the *Field* and other periodicals, and there are few visitors to the Victoria Falls who are not well acquainted with their names and with those of other traders, such as Messrs. Phillips, Westbeach, &c., to whose hospitality and friendly aid most travellers in those regions have at one time or another been indebted.

The winter season (April to September) is that usually selected for travelling, and they return in the summer to the high lands of the Transvaal to replenish their stores and dispose of the proceeds of their winter campaign. Sometimes the Zambesi traders go for this purpose to the sea-coast at some of the ports between Durban and Cape Town; but more commonly they rest and fill up their stores at some of the advanced traders' stations in the Northern Transvaal. Here in districts which, as late as Sir William Harris's time, were the resort of the elephant and giraffe, the traders find ready to their hand assortments of every kind of goods needed for the trade with the interior. Let me describe, as an example, such stores as I myself visited at Heidelberg, Pretoria, or Klerksdorp—the latter, perhaps, the most striking from its being in but a small village, with a few houses of farmers in addition to those occupied by the trader and his assistants. Mr. Leask, the owner, is an energetic Orkneyman, who has himself been for ten or eleven years a trader in the Zambesi country, and having married a well-educated Englishwoman, has settled down at Klerksdorp, where his household has every comfort which would be found in a similar home in a Scotch country town. He employs two or three young Englishmen, who with their families live near the store, and assist Mr. Leask in affording hospitality and shelter to the traders who annually visit him. At his table one guest will recount his travels prospecting for gold in the little known regions north and east of the Waterberg, which are described by Mauch as the probable source of the riches of Sofala. He drops little more than mysterious hints as to the results of his prospecting; but has many an interesting tale of adventure by flood and field, among tribes hardly known by name to his hearers. Another guest will follow him with descriptions of wild ostrich and lion hunting in the Kalahari, of the sufferings of his party in the Great Thirst Land, when they lost their

Bushmen guides, and of the scores of elephants they had slaughtered by driving them into the swampy country towards Lake Ngami. Then will follow the experiences of a trader who almost annually visits the Zambesi, who has pushed beyond it till he believed himself to be within ten days' trek of the place where Livingstone died, and who has heard tales of the great traveller from the natives, who revere his memory as the Doctor who practically preached, by example, goodwill to all men, and whose smallest acts have been magnified into magical performances by the natives. Thus Livingstone's experiments to ascertain the depth of the Zambesi Gorge at the Falls, by a line with a newspaper over the stone to make it visible as it descended, are related as a marvellous flying-machine with which he could cross the vast gorge; and his persuading a savage and sulky chief to let him pass through his country, is accounted for by the Doctor having shown the barbarian, at the bottom of a hole where he smote the earth with his staff, the legions of red-coats he could summon to his aid.

Nor were Mr. Leask's stores the least interesting part of his establishment. The import stores contained everything that the up-country trader could require, including the latest importations in millinery and furniture from London or New York, harmoniums for churches and mission stations, and pianos for the fore-trekkers' daughters; while in the stores on the export side were collected many valuable trophies and curiosities from the far interior. Two waggons were loading up some eight tons of ivory destined for Port Elizabeth. Packages of ostrich feathers were piled opposite rows of rhinoceros horns, bundles of elephant and giraffe tails, heads of almost every kind of large game, and bundles of skins of all the rarer and more beautiful furs. Everything spoke of a commerce extending through civilised regions to wilds rarely visited by the white man, and a diligent gatherer of notes from the frequenters of the store might collect anecdotes of the brief history of these lands since Moselekatze and the fore-trekkers first met, fifty years ago, in regions then almost unknown to Europeans, varied with descriptions of the enterprising trader's last winter visit to regions which Livingstone gave his life to explore.

This is one of the circumstances which renders the Transvaal so excellent a base for exploring Central Africa. At places like Klerksdorp or Rustenburg, or, still better, at Shoshong, Khama's capital, the traveller might find an advanced base for his operations in penetrating the far interior. Here he might deposit in safety his collections, might replenish his stores, and from time to time return to recruit his strength and that of his followers, and to make a new departure in his exploring tours. As far as I could judge from the somewhat vague descriptions of the men who had crossed it, the belt of unhealthy country bordering each bank of the Zambesi is narrower in the region of the Victoria Falls than further east or west, and if the confidence of the tribes on the northern bank is once gained, a comparatively healthy high land where cattle would thrive and waggons could travel might be gained by the traveller towards the Lake Region.

Mr. Humphery, a young traveller now present, who visited the Victoria Falls a few seasons ago, gives the following account of the mode of passing the Tsetse-fly Belt on the south bank of the Zambesi about seventy miles above the Falls.

Leaving the last halting-place free from tsetse in the evening, they travelled all night to avoid the insect, and before morning reached a narrow strip of country free from fly but without water, though there was grass for the oxen. The next night a shorter march brought them to the river in time for the oxen to drink and return back to the spot free from fly before daylight.

It must be remembered that the tsetse-infected tract varies from year to year with the movements of the large game, and according to the nature of the season; and that the area where the fly is fatal appears to be diminishing rather than increasing.

I have said nothing, in speaking of Damaraland, about the Trek Boers, whose presence there may prove a new element in African colonisation.

It is about twelve years since the idea took possession of many of the families of the Dutch fore-trekkers in the Transvaal, that an easy route northward was to be found by crossing the Great Thirst Land to the upland pastures north of Damaraland.

One of the first to make the experiment on a large scale was Mr. Van Zyl, an intelligent and wealthy Boer who, accompanied by his wife and family of several stalwart sons and a little daughter, with many native servants, moved gradually to the edge of the desert, propitiating the petty chiefs on his road, and by patient inquiry and observation, and never moving till he knew what was before him and had secured water for his cattle, reached the pasture country on the Damara side of the Kalahari Desert, and hunted for several seasons in the valleys sloping towards Lake Ngami and its northern affluents.

About four years ago, having communicated with Mr. Coates Palgrave, then on a mission to Damaraland, he reached Walvisch Bay, and with his family took shipping to Cape Town, and having disposed of the proceeds of several years' hunting and trading, which were said to amount to several thousand pounds in value, he returned to the North-West viâ Walvisch Bay, and established himself, and built a house, beyond the north-eastern limit of the Damara country, in a tract where previously there had been no settled inhabitants nor recognised ruler.

I was sorry, however, to hear before I left the Cape, that he had not been allowed to remain undisturbed. He had been attacked by some of the Namaqua tribes, who supposed him to be connected either with their enemies the Damaras, or with the Trek Boers; and after being plundered and ill-treated, he only saved the lives of himself and his family by taking refuge with the Damaras.

The whole of the country in that quarter is much disturbed, and there appears every prospect of a renewal of the wars between the Damaras and Namaquas which up to a few years ago devastated all that region.

Mr. Van Zyl had been followed by more than one large body of Boers "travelling or emigrating" from the Transvaal. They left for the most part some years before the annexation of the Transvaal, and their movement appears to have been caused by various motives.

Some were dissatisfied with the then Government of the Transvaal Republic; but many more appear to have been actuated by non-political motives—by restlessness or love of change—by the same longing to reach the promised land of freedom which prompted the earlier emigrations from the Cape Colony many years ago, and by exaggerated reports of the fine pasturage and abundant game which had rewarded Van Zyl's enterprise.

But unfortunately those who followed Van Zyl appear to have lacked his judgment and discretion. They did not always secure the friendship of the tribes east of the Kalahari, through whose territory they must pass. They marched at the wrong seasons and by wrong routes. They failed to secure water for their cattle, and had to remain long in unhealthy places. Numbers died from fever and starvation. Many more lost all their waggons and cattle; and they arrived in the Damaraland side of the desert much reduced in numbers, and sorely impoverished.

But their spirit was unbroken. When their destitute condition became known in the Cape Colony, assistance was generously sent them viâ Walvisch Bay by their English and Dutch friends in the Cape Colony and Transvaal. Ample supplies of food, clothing, and money to purchase stock from the Damaras, to the aggregate value of several thousand pounds, were sent up to them in charge of Mr. Haybittel, an experienced trader. But few families availed themselves of offers to return to the Transvaal, viâ Walvisch Bay, and in a coasting steamer to the Cape. The great body determined to remain and push onwards through the good pasture country which they found to the north of Damaraland.

When last heard of, a large body, comprising 200 waggons, had crossed the Cunene River into Portuguese territory, and after some ineffectual negotiation with the Portuguese authorities at Mossamedes, had recrossed the Portuguese boundary, and were making their way through a good hunting and pasture country to the north-east, and some families seem to have settled between the Damaras and Ovampos, in a region previously uninhabited, which they have nearly cleared of elephants and ostriches.

I have heard the total number of these "Trek Boers" estimated as high as 600 families. Those who returned viâ the Cape gave sad accounts of their sufferings in passing the "Great Thirst Land" and from fever in the low-lying regions towards Lake Ngami; but they generally attributed their sufferings to want of experience of the country, and not to any insuperable difficulties from want of water, if they had known where to dig for it, or of healthy spots for halting, if they had known the country better. They described the region they had reached north of Damaraland as well adapted for settlement, and did not think their companions there would ever wish to return south. Till Mr. Haybittel communicated with them, they were greatly in want of everything but what they could procure in the chase, having been obliged to abandon on the road large quantities of stores, and to use leather in place of their worn-out clothing. He furnished them with supplies of European clothing, coffee, sugar, garden seeds, and seed corn for immediate use, with some cattle and goats for breeding, and put them in communication with traders who would supply their further wants.

Their future is a very interesting problem. They are likely to found a progressive colony of European race communicating with Europe through the ports of Walvisch Bay, or still more probably through the southern ports of the Portuguese possessions on the West Coast. They are likely to receive considerable accessions from European and American adventurers of various races. But there is much risk of their falling off in the civilisation which they brought with them from their old homes in the Transvaal and Cape Colony. The elders are all rigid Calvinists, "and something more"—"doppers," who view with disfavour even the hymns of their old Dutch Reformed Church, and have little toleration for any literature beyond the original text of Scripture. But they would, I have reason to think, hail with gratitude any one of Churches akin to their own who would visit them as pastor and teacher, and if he added to his qualifications as a missionary some knowledge of medicine and surgery, he would be still more acceptable.

I have met many earnest young men of the Scotch and Dutch Presbyterian Churches who might find a new field of labour among the Trek Boers, and it is not out of place to mention the subject here, for no young geographer could desire a more promising field for geographical research than might be open to him by such a mission.

I have endeavoured in these brief remarks to give you some such idea as I myself received of the physical aspects of that great southern temperate region which is already so largely occupied by colonists of our own stock, and which seems so clearly destined to form a home to many millions of settlers of our own or kindred races. Time does not allow me even to allude to the vast natural resources which are now being developed to such an unexpected extent. I may not detain you by telling you of the mineral riches of the craters, which in ages long before the continent took its present shape, were the factories of diamonds which modern industry is extracting to the value of over two millions annually. I have passed over hundreds of miles where the scattered farmhouses as frequently send their waggons for coal as for wood to neighbouring ravines. I have met waggons conveying many tons of lead just extracted from the Marico mines, and I have seen vessels of copper formed from the native metal by the Bushmen of Damaraland, indicating ores of even greater richness than those so successfully worked by the copper mining company in Little Namaqualand. But neither on the mineral nor the great agricultural riches of the country can I now dwell, for it is not so much as a future home for the overflowing millions of our race, as for the road it opens to Central Africa, that this southern plateau of Temperate South Africa has its chief interest for the Royal Geographical Society.

It is as a safe and sure highway to the central regions of the continent that I think attention may now be profitably drawn to the route by which the great African problem was first attacked by Livingstone.

There are many now present who can remember the joyful surprise with which his countrymen heard of the unexpected success of his first great journey.

In his second journey he essayed to take up by a more accessible route the clue which he had previously followed, and would no doubt, but for the death of his companions, have soon reached the point for which he was making, when he first fell in with the Zambesi. But life was too short for his great designs, and though much has been filled up by the gallant men who have followed him, there is yet the vast region between the Upper Zambesi and the Central Lake region which remains to be explored, and which I submit might be most easily reached by steadily following up the original direction of Livingstone's first journey.

We have seen that, at least as far as Khama's capital at Shoshong, there is no difficulty to be encountered greater than besets an ordinary Transvaal trader or farmer, travelling by ox-waggon to his home in the Transvaal.

At Khama's capital he might form his base for further operations in a civilised though small community of his own countrymen, and in perfect safety for any property he may wish to leave behind him. Nor, after leaving Shoshong, need he fear any real danger or difficulty till he is within two marches of the Zambesi.

To reach that river is now an undertaking by no means formidable to an ordinary tourist, and time and temper are alone required to secure the confidence of the chiefs beyond the river, and obtain their permission to penetrate to the unexplored regions beyond.

If, as Dr. Holub told us, the chiefs are convinced that the traveller is of the same race and disposition as Livingstone, the road is speedily opened. I think at our last meeting we saw and heard enough of Messrs. Thomson and Stewart, to assure us that the race of travellers like Mungo Park, Bruce, and Livingstone is not extinct, and we may trust to the energy, sagacity, and humanity of such men to complete that portion of his great work which Livingstone died in performing.

Previous to the reading of the paper, the PRESIDENT, Lord ABERDARE, said it would not be necessary on his part to introduce to the Society their distinguished friend and former President, Sir Bartle Frere. But he would say of him, that however important and arduous the public work in which he had been engaged, he had never for a moment forgotten that he was a Fellow of the Society, and never had lost his interest in the study and the promotion of geography. Thus much he deemed it right to say: more than that would be simple superfluity.

On the termination of the paper,

The PRESIDENT said they were fortunate in having amongst them Sir Henry Barkly, the distinguished predecessor of Sir Bartle Frere in the government of the Cape Colony and South Africa. He hoped he would favour them with some remarks on the subject of the paper.

Sir HENRY BARKLY said he feared he could add little to the comprehensive account which Sir Bartle Frere had just given of the topography and resources of Southern Africa. So far as his experience extended, he could fully confirm the accuracy of the statements that had been made and the descriptions given, and he also concurred in most of the opinions expressed. He had long believed that the progress of settlement in South Africa and the founding of comparatively large towns like Kimberley and Pretoria, hundreds of miles away from the coast, ought greatly to facilitate the exploration of parts of the interior of that continent of which they as yet knew little. He had had the pleasure of listening to Dr. Emil Holub last year, in the address he delivered before the Society, respecting his explorations of the region of the Upper Zambesi, and he felt then that it was very desirable that further reconnaissances such as he described should be made in that direction. He was glad to learn by recent news from Vienna that Dr. Holub was about to repeat the experiment, and even to attempt to traverse the whole interior from Cape Town to Cairo. He hoped he would be successful, but at any rate a great deal might be done in starting from Pretoria and going by Shoshong in the way that Sir Bartle Frere had described.

The PRESIDENT said Sir Bartle Frere in the course of his address mentioned the name of a young traveller, Mr. Humphery, who had recently reached the Zambesi and the Victoria Falls. One of the great advantages of this route was that, for the greater part at any rate, it was free from the troublesome fevers which had struck down so many enterprising travellers. All who had listened to the account of the sufferings of Mr. Keith Johnston before he succumbed to fever, and also of what Mr. Thomson went through, would see the enormous advantages of a route to the interior so comparatively healthy as that which Sir Bartle Frere had described. But there was one exception to that general salubrity, and that was the belt of country on either side of the Zambesi which nobody could cross without being exposed to this danger. Mr. Humphery was acquainted with those parts of the Zambesi where the fever territory was the narrowest, and any information he could give them regarding it would be most welcome.

Mr. HUMPHERY thought it would seem presumptuous on his part to speak on the subject after Sir Bartle Frere. But he could confirm all that had been said about the facility of the journey between Shoshong and the Zambesi, in support of which he might mention that since he was there two ladies had travelled along it to the Victoria Falls. The danger from fever on the banks of the Zambesi had been much exaggerated. He certainly suffered himself, but this arose chiefly from the hardships he had undergone and from bad food. Other travellers, well-found in provisions, had not a single case of fever. He knew nothing of the northern side of the Zambesi, because, though his party tried very hard, they were not allowed by the natives to cross. Since then traders had opened up the region, and he believed there was healthy country on the other side.

Sir Fowell Buxton observed that the subject of Sir Bartle's paper could not fail to be of great interest to all who felt anxious about the continuance of the work of exploration in Central Africa. The line indicated by Sir Bartle compared favourably with others which had been talked about and made use of during late years. At the Brussels Conference, which met to consider this four years ago, the route now suggested was, as far as he remembered, not even thought of, the accessibility of the country from the south not then being known. Still there were long distances to surmount from the most advanced bases of operations; such as Shoshong, which was a long way from the Zambesi, and from the Zambesi to the Lake region there was still a very considerable interval. But it must be observed there is a connection between the Zambesi itself and Lake Nyassa viâ the Shiré, and the interior was easily reached by that route, and as the Society were informed at the previous meeting, the space between Lake Nyassa and the south end of Tanganyika was likely to prove much more practicable than had hitherto been supposed. Therefore whether they looked to reaching the Zambesi from the coast or from the interior, they could not fail to perceive that the importance of that river had much increased of late years as a means of reaching the interior. One matter of some hopefulness was the fact that the tsetse fly seemed to be gradually receding before the advance of civilisation. Efforts had been made to construct a road from the coast into the interior, and the grand attempt made by the King of the Belgians to introduce the elephant as a beast of burden should not be forgotten. Some attempts had been made also to introduce wheeled traffic, though the fly had hitherto stood in the way. He could not, however, but hope that better success was in store in the future, since it appeared that the tsetse scourge disappeared wherever the large game was driven back.

Sir Bartle Frere said with regard to the possibility of getting across the fly belt, the testimony of the chief hunters and traders went to show that the tsetse certainly did to a great extent follow the movements of the great game; and also that as the country became better known, particular points were discovered by the guides where even during the daytime, in the immediate vicinity of the bush infested by the fly, there were cleared spots where the fly never touched a horse, and that those who had been much in the fly districts were able to discover routes through the infested belts by which horses could with great care be conveyed; and of course if that was the case on a small scale, it might gradually be that the means of carrying animals subject to be bitten by the tsetse through the infested belt would increase. Mr. Humphery had told him that traders had conveyed a waggon across the river, and it had been purchased by a chief on the other side, but unfortunately he was not beyond the region so fatal to oxen. However, there appeared to be very little doubt that there was a region perfectly free from the fly at no great distance on the northern bank, and within practicable reach. He hoped nothing he had said would be taken as implying any wish that effort should be slackened in other directions, for in a case of this kind it was only by attacking the unknown region from every side that they could hope for complete success. One of the French missionaries, M. Coillard, who had long been resident in Basutoland, being disappointed in the effort to establish a mission in the direction of Umzila's country, went with his very intelligent and energetic Scotch wife to a position above the Victoria Falls, and was now in hopes of returning to the Zambesi and establishing a mission about 80 or 90 miles above the falls. He was quite sure from what he had seen of M. Coillard that, wherever he placed himself, he would found a new base of operation for further exploration in the interior.

Brief Account of Recent Journeys in the Interior of Congo.

By the Rev. T. J. Comber.

Map, p. 64.

I have been waiting month after month, hoping to have something of geographical interest to communicate to the Society, but things have not gone so easily as I had anticipated. For a whole year I have been trying to go forward, but although I have walked about 1000 miles hither and thither, and made five attempts to pass the particular belt of country which lies between St. Salvador and the ivory districts—the doors of which are kept by Makuta and Zombo—I have not yet succeeded.

In the first place, a week after our arrival at St. Salvador, which we reached after a somewhat trying journey from Mussuca on the River Congo, with 100 carriers, the Kru men I had engaged for our expedition ran away during a week when I was delirious with fever, stole a canoe when they reached Mussuca, and got down to Banana; from which place they refused to return to work they are so entirely unaccustomed to. Then our donkeys died one after the other, until the whole stud of eleven was lost. This was probably the result of innutritious grasses. Thus all our means of carriage having failed us, we have had to rely on the men procurable here—none of your plucky cosmopolitan Wangwana or Wanyamwesi of Eastern Africa, but cowardly and timid people, who have palavers with half the towns round about, and who will not proceed unless they first send an ambassador to ask, "If you please, may the white man come to your town?"—a question ruinous to progress in African travel. These are the kind of men who recently deserted us on the road when we had three days' hard marching before us, and only one boy to help us in carrying our provisions, blankets, and stores, because they were afraid to go to Kinsuka or Congo di Lombo; and on another occasion, for similar cowardly reasons, refused to accompany us on a five days' journey to a cataract on the Zombo mountains. These instances will illustrate the character of the people, and the hopelessness of all attempts to undertake long journeys with such carriers; and they will also explain our having done so little.

The enclosed rough map will serve to show our routes, the populousness of the country, and the furthest points we have reached in the interior:—these being Tungwa of Makuta, Songa, Ndinga, Kinsuka, and Mbangu on the Zombo highland. It will also show the labyrinth of rivers, which we have not yet succeeded in unravelling to our satisfaction.

It will seem rather presumptuous on my part to challenge the positions fixed by Lieutenant Grandy for the towns north-east of St. Salvador, but both by latitude observations and dead reckoning, several times repeated, I find them a long way out, and can only put the error down to ill-calculated dead reckoning on Grandy's part. In Grandy's map,[*] Banza Umputa, viâ Banza Tanda, is distant from St. Salvador (or Congo) 70 English miles in a straight line. This journey we can do in eighteen hours of easy marching, by Grandy's route, which gives nearly four miles an hour, including alterations of direction, windings of the road, &c.—an impossible rate. Moreover, my observations taken night after night, and giving uniformly progressive results, satisfy me as to the true positions of most of the places on my map. One or two of these observations (of stars) I send herewith to the Society.

I will now make a few remarks about the river system of this region. The country abounds with grass and papyrus marshes, out of which issue many of the streams. These divide into two groups:—one running in a westerly and south-westerly direction, to the Atlantic Ocean, and the other flowing into the Congo. The only one of the former which we have anything to do with is the Brije or Ambrije, the Loge being too far to the south of us, and the Lilunda not reaching any of our lines of routes. A considerable number of streams and rivers, however, flowing hence, go to swell the Congo. The chief of these are the Mpozo, a deep river, about 35 yards wide, running into the Congo just below the Yellala Falls, and immediately opposite Mr. Stanley's present first camp, Vivi; the Luvu or Silluv, which joins the great river probably just below the Falls of Isangila; and the Kwilo,[†] perhaps identical with the "river 30 yards wide" of Stanley's map. The Kwilo takes its rise somewhere east of Zombo, and is joined by the Lukaji, Loanza, and Lusilosi, and where it passes Ndinga, is a formidable river 30 yards wide, deep and muddy, and said to abound with crocodiles. It is crossed by well-contrived swing suspension bridges, fastened to the large limbs of trees on either bank. I have crossed three of these bridges over this river. The Luvu or Silluv takes its rise among marshes in the plain west of the Zombo plateau, and flows past Lembelwa and Banza Tanda. The Mpozo receives a large number of affluents, viz. the Lunda with its branches, which rises among the marshes of Madimba, south-east of St. Salvador, and flows north, where we cross it on the Mussuca Road; the Lueji, passing the foot of the St. Salvador plateau, and joining the Lunda (both these rivers are too deep for fording, and are crossed by swing suspension bridges); the Lercossa and the Ngandu, which though both running south where we cross them, must also join the Lunda; the Lozo and the Pozo. These all go to form the Mpozo, which is crossed by canoe in going to Palaballa.

Most interesting of all, however, is the Brije river, on account of its fine fall. When Grandy was journeying from Congo to Makuta, he saw, through the haze peculiar to the season in which he travelled, some high land to the east which he called the Zombo Mountains (Zombo being in the vicinity). We have often admired these mountains (for such they appeared to be), and in travelling along the same road as Grandy, but in the rainy season, when the atmosphere is clearer, we were favoured by the distant view of a lofty waterfall descending from the summit of the mountain face. Subsequently we obtained another sight of the fall from our house at St. Salvador, and again from a height near Quanza, on the road to Mussuca. I resolved to avail myself of the first opportunity of visiting this grand geographical feature, and was able a fortnight ago to carry out the design. Accompanied by Mr. Hartland, one of my colleagues, and taking with us only one boy as a carrier, we left Lembelwa near Ma'anti, and travelled almost due east for a day and a half, passing a number of towns, planted on the summits of steep hills and divided from one another by nasty swamps, and arriving at Banza Zulu at the foot of the steep ascent. A difficult hill lay before us, up which we climbed in a thick soaking morning mist. Unable to carry any instruments, as we had but one boy for a five days' journey, I could only judge approximately the height, which I estimated at 450 feet. Scarcely able to distinguish anything in the heavy mist which enveloped us, we followed the path to a town on the summit, and although the place was previously unvisited by a white man, we made free to enter a house and boil water to make tea, and wash our feet, as we were soaked to the skin with the mist, and to the outermost garment with perspiration, and had no change of clothing. The town, Mbangu, we found to be a large one, containing about 2000 inhabitants. We were received with civility, the place being the native town of Senhor Garcia, Secretary of State to the King of Congo. After the mist had cleared away, and we had managed to dry our clothes, we sallied forth to see the fall, but on this occasion could not get nearer than 500 yards, from which we had a view magnificent in the extreme. From a ravine near the summit burst out a river, which was precipitated over a cliff, with a grand perpendicular fall of 150 feet. We gave it the name of "Arthington Fall," after Robert Arthington, Esq., of Leeds, the munificent patron of Central African Missions.

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[*] Vide Journal R. G. S., vol. xlvi. (1876), p. 428.

[†] This river is the Quiloa of Lieut. Grandy.—[Ed.]

The general effect of the cataract is very grand and peculiar, the water dropping over the ledge, down the bluff face of the rock and into the ravine beneath, and seeming, at the distance at which we stood, to be without rapid motion—an effect probably due to the spray. It continues to leap and tumble for 250 feet more (the whole fall being quite 400 feet) until it reaches the plain below, where, when we crossed it, we found it to be 15 yards broad, averaging two to three feet in depth, with a current of about eight knots an hour, taking one almost off one's legs. This is in the middle of the *dry season.* Where the river comes from, the natives cannot or will not say, but from its falling in such volume from nearly the top of the height, we may be sure that we have here, not a mountain, but the escarpment of an inland plateau. The river is the Brije, and it falls into the sea at Ambrizette. Its course above Mbangu will be an interesting little problem to work out in the future. On this occasion, having no carrier, and no goods but what a handbag would contain, we were obliged to find the nearest road to Congo, a fatiguing march of fifteen hours, which we did in two days.

Little can be said about the Madimba country (to the south of St. Salvador), except that it has enormous marshes, is more wooded than most districts hereabout, and is thickly populated. We have gleaned some information about the native towns further towards the interior. At Moila, two days' good marching from Congo, we have an out-station generally occupied by Mr. Hartland. Further on is Kinsuka, a large, central, trading town, where the white man is as yet by no means welcome: the position I give to it on our map is from dead reckoning. When my colleague and I visited it, we received a message from the chief that we had no business there, that we must not pass the night in the town, and that the sooner we were gone the better. Songa is a fine large town, under the influence of Bwaka-Matu (Red Ears), the head chief of Makuta. After a residence there of six days, doing chiefly medical work, the chief was obliged to give me my dismissal on account of Bwaka-Matu's objections. Ndinga is a small town, but also under the influence of Bwaka-Matu, whose peace of mind we have so much upset lately by our restless behaviour, that he wishes, it is said, to catch and kill me.

I can say but little with regard to our present plans. When I was on the coast a short time since, I managed to obtain seventeen Kru men, whom for two months we have been able to keep at St. Salvador, and who have once been to Moila, our forward station. We are obliged to go very gently to work with these men, for fear of their running away. I start to-morrow morning in company with Mr. Hartland and eight of our best men, to try a route between Zombo and Makuta on the line of road to Stanley Pool. I trust we shall succeed this time; we are very sanguine. If the Kru men go, it will be the first time they have acted as carriers into the interior—an employment quite out of their line, used as they are only to seaboard work. Grandy had thirty Sierra Leone men (not Kru boys, I understand), *not as carriers*, but as soldiers; for all the carrying was done by people of the country. If we only had carriers our difficulties would be over; but I believe it is far easier to go to Uganda or Ujiji from Bagamoyo than to reach Stanley Pool from here, being, as we are, without any equivalent for Zanzibar porters. However, we hope to succeed, and to-morrow we start.

ST. SALVADOR, CONGO, 18*th August*, 1880.

Subsequent Proceedings of Mr. Comber.—Mr. Hartland has sent to the Baptist Missionary Society a report of the journey referred to in Mr. Comber's concluding paragraph, and which, as we briefly mentioned in our last issue,* had so unfortunate an ending. He writes from St. Salvador on September 10th. The party appears to have consisted of Messrs. Comber and Hartland, with eight Kru boys, Cam, and the little Linguista, who accompanied them to Mbangu. After a somewhat difficult journey of three days from Ma'anti, they arrived at Banza Loango, a town on the banks of the small river Loango, and at the foot of the hills of the interior plateau. Here the Kru boys, who had already shown much fear of the people since starting, were so thoroughly frightened that, although the road was a difficult one, seven of them took advantage of a dark night to run away. Thus deserted, Messrs. Comber and Hartland tried to push on to Sunda, but the natives would not hear of their ascending the mountain or going on, so they were compelled to return to Ma'anti. They were now much perplexed to know what to do for the best, as every road seemed closed against them, and their Kru boys had run away. They had, however, a second gang at Congo, who had been on a former occasion as far as Moila, and with these they determined to try to find a road. Since they were last at Makuta—which is by far the most direct road to Stanley Pool—Messrs. Comber and Hartland had heard many conflicting reports; the last, which seemed to be known all over the country, being: "Bwaka-Matu says the white men may come to my land and pass through; they may sleep one night in my town and go on; they may bring Kru boys into my country, and I will allow them to pass, but they may not bring Congo people with them." They resolved accordingly to visit Bwaka-Matu and put his good intentions to the test. They reached safely Tungwa, which Mr. Hartland describes as the finest and prettiest African town he has seen, and the people making no opposition to their passing, they were soon beyond it, travelling through the broad farms belonging to that flourishing place, on their way to Banza Makuta. Two hours' sharp walking brought them to a steep hill, on the summit of which was a fine town. Here the people were a little mysterious, and did not want to let them know its name. After a rest they descended the hill, and ascending another, reached a second town, where the people were rather sullen, and would not give the name of the place, but simply pointed out the road to Banza. The party accordingly descended, crossed a stream, and ascending a steep hill reached Banza Makuta. The reception they received Mr. Hartland says he shall never forget. They walked into the town and asked the people its name, but got no answer. The people drew back a little, and then one man called out: "Ndabonga nkeli, vaunda mundeli" ("fetch the guns; kill the white men"). In an instant the people rushed away, returning armed with sticks, huge pieces of stone, knives, cutlasses, and guns, and without any word of palaver, commenced dancing and leaping round the party, and brandishing their weapons in a threatening manner. Eventually the missionaries resolved to attempt flight, and started off amid showers of stones and blows. All got hit and bruised, but managed to reach the top of the next hill, when a sudden report rang out behind them above the uproar, and Mr. Comber fell. Mr. Hartland tried to assist him to rise, but he begged him to go on. The following is Mr. Hartland's account of the remainder of the flight till they reached the friendly town of Sanda:—

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* Vol. ii. p. 765.

"How I got down that terrible hill, through the water, and up the next hill, I don't know, but I overtook Cam just outside the next town, and made him stop and walk through it, for fear its inhabitants should attack us if they saw us running. They had heard the shots and were out with their guns, but seemed undecided what they ought to do, and their indecision saved us. Had they been prepared for us, our case would have been hopeless. As we left this town I heard Mr. Comber shouting behind me, and saw him running towards us. We waited an instant until he came up, and then went full speed down the next hill and up into another town, followed by the furious Banza Makuta people. Mr. Comber kept up well. He had been shot in the middle of the back, but the ball had not entered the lungs, for he experienced no difficulty in breathing, and his wound did not bleed very much. After we left the last town and got on the road, we thought the people had given up pursuit, so left off running, and walked on sharply along the road to Tungwa; but, on looking round, soon we saw three men following swiftly after us, armed with knives, sticks, and a gun. They gained on us rapidly, and we, though beaten and wounded, took to running again. When we started, our pursuers set up a most horrible, demoniacal yell, redoubled their efforts, and threw stones after us, many of which whizzed past, but none hit us. It was now a race for life along that weary road; we had to exert ourselves to our utmost, and throw away everything we were carrying. On we dashed, and on came the bloodthirsty savages behind us; once they came within shot and fired, but without harming us. So we continued running and being run after for five miles, until we drew near to Tungwa, by which time our pursuers had grown tired and given up the chase. We walked hurriedly through Tungwa without allowing the people to know what had happened, crossed the river, and were out on the road again. The shades of night were now falling, and we pressed on at our utmost speed, fearing still that the people were not far behind. By dark we reached the town where we had left our Moila man. With his aid we continued our journey in the darkness, often tripping and stumbling, but still continuing our course, for life depended on our putting a long distance between ourselves and Banza Makuta, and outrunning the news in this still unfriendly country. At nine o'clock we reached Kola, the town where we had slept the previous night. Here we rested until past twelve, and then—fearing pursuit, and, perhaps, too, treachery from the people—we started again. The night was pitchy black—no moon or stars. We could only feel our road, and often had to hold each other's walking-poles in order to keep together. So we walked on until three o'clock, passing through several towns on tiptoe for fear of waking the people; but at last we came to a large town, where our guide lost the way. There was a river before us which could only be crossed by a bridge, and that bridge we could not find in the darkness, so, after an hour's fruitless search, we lay ourselves down in the road to wait for the day—two weary hours, during which the others slept, whilst I, after in vain trying to find another way over the river, sat and watched. When the long-wished-for dawn broke we went back into the town, and found the road. We were all desperately tired, and Mr. Comber was getting faint with his wound; but we pressed on until we had crossed the Kwilo, passed Banza Mputa, and reached a friendly town two hours beyond. Here Mr. Comber was quite 'done up,' and the small flask of brandy—the only thing we managed to save—failed. We sat in this town about an hour, and ate a little rice. Mr. Comber revived a little, and we started again. Fortunately, we were able to get a few men, and I made up a hammock with a blanket, so that we got on as far as Sanda by the middle of the afternoon, Mr. Comber in the hammock, Cam and I walking. At Sanda we were among friends—warm friends too—and their expressions of indignation and kindly sympathy almost brought tears into our eyes. Everything we wanted they got for us, and we laid down to sleep with a feeling of comparative safety, knowing that if we were followed our friends would have protected us at the risk of their own lives."

Having ascertained at Sanda what injuries the party had received —Mr. Comber was the only person seriously hurt—they procured fresh carriers for the hammock and a large escort, and in two days arrived at Congo, having travelled about 80 miles in three days. On the evening of their arrival, Mr. Crudgington extracted the bullet—described as "a square piece of ironstone"—and at the conclusion of his letter Mr. Hartland reports that Mr. Comber was doing very well.

Notes of a Journey from Lagos up the River Niger to Bida, the Capital of Nupè and Illorin in the Yoruba Country, 1879–80.

By the Rev. John Milum.

On August 14th, 1879, I left Lagos in one of the branch steamers belonging to the Mail Company *en route* for Bonny, from which place I transhipped for the river Niger.

At Akassa, on the 2nd of October, I embarked on a trading steamer of the United African Company, and began my journey up the river. We passed quickly through Louis Creek, and arrived at Darrall Island, where the Niger proper begins, and the mangrove swamps end. The banks are here thickly strewn with trees of large growth and beautiful foliage; very noticeable are the bomban, oak, oil-palm, and cork-wood trees, and here and there are extensive plantain farms, the fruit of which seems to be the staple food of the natives. Small villages appear, the houses of which are built of mud and covered with grass, and as the river is now in flood the water surrounds them, and in some instances covered them entirely. In most of the villages there are curious thatched houses raised upon tall sticks, in which the native fisherman stands in the wet season, and plies his art with a common native basket attached to a cord.

Between the villages of Anjiama and Otua, a whole bend is left out in the Admiralty Chart.

After passing the Wari branch, the river spreads out to over a mile in breadth, and forms a splendid sheet of water. Beyond the village of Utchi the scenery alters; the banks are not so densely wooded, and the river has flooded large tracts of country, covering what are in the dry season large islands. Great numbers of white cranes, fish-eagles, divers, and kingfishers now appear. For the purposes of irrigation the natives have cut small gutters from the overflowing banks into their farms, which are many feet above the river in the dry season. From the town of Alenso may be seen the first high ground after leaving the coast, a range of hills running north-west and south-east.

Onitsha, a large trading town situated on the eastern bank, has given trouble to the European traders for many years, but has been recently bombarded, and the ringleaders punished. On the opposite bank, a few few miles further up, is the town of Asaba, beautifully situated on the slope of a hill; it is reputed to be the healthiest spot in the lower river, and has been used by traders as a sanatorium. The river here presents a beautiful appearance, winding away between banks well wooded with fine trees, but not so thickly grown as to hide the well-cultivated farms between, and far away on the distant horizon is a splended range of hills, apparently wooded to the top. At the town of Abokein, where the Igarra country begins, the river stretches out in long perspective, with the banks on either side forming alternately bays and headlands, whilst tulip trees in flower make the banks glorious. At the town of Idda, on the eastern bank, remarkably situated on the top of red ironstone cliffs, rising perpendicularly 180 feet from the water's edge, the view is again enchanting; the cliffs, the wooded slopes of the hills, the conical-roofed houses of the town, a branch of the river winding away to the east, and the broad river stretching out majestically towards the mountain ranges, forms a sight not easily forgotten. The course of the river is now between steep rugged hills, rising so high as to deserve the appellation of mountains, which sometimes so enclose the river as to give it the appearance of a lake, alternating with verdant slopes well cultivated with maize and guinea-corn. The range of hills on the west finds its highest point in Mount Oril, 1400 feet high, at the base of which we passed, but could not see its summit as it was covered with clouds. The hills on the east terminate in well-cultivated slopes, and at the confluence bend away up the Binue, and again crop up on the Niger bank. On both banks are small villages picturesquely situated, surrounded with farms, and here and there gigantic granite boulders, till arriving at Lukoja, at the confluence of the Niger and Binue, which town is situated on the slope of a hill, surrounded by a series of other flat-topped hills, so high and steep as to shut out the horizon from view. Soon after leaving the confluence the immediate neighbourhood of the river banks is low, but the range of hills continues on either side in the distance till nearing Egga, when they again close in on the east, and terminate in Kippo-hill, opposite to and about five miles from Egga. The town of Egga is situated upon three very low-lying islands, at the western bend of the river; it is dirty, ill-ventilated, and thickly populated, but well situated for trading purposes. We arrived in Egga on the 8th October, the steamer having, therefore, accomplished the journey in seven days, steaming only by daylight and anchoring at night.

On October 14th I started in a canoe for Wanagi, *en route* for Bida, the capital of Nupè. Our passage was over what is, in the dry season, farm land and prairie, but is now covered with many feet of water from the flooding of the River Baku, which flows in a general south-easterly direction into the River Niger. When this great overflow subsides great numbers of fish are left behind, to catch which the natives set the grass on fire. Wanagi is a town of some importance, situated on the slope of a hill about 450 feet above sea level. Our journey from this place to the town of Bida, a distance of about eight miles in a westerly direction, was through well-cultivated land, with table-mountains and sloping hills on either side. The town of Bida, with a population of nearly 100,000, 450 feet above sea-level, is surrounded with a wall, square in shape, with a deep trench, the height of the wall from bottom of the trench being about 20 feet, entrance and exit being made through gates connected with all the principal roads. Flowing through the midst of the town is the river Lauja, a considerable stream during flood. The town is laid out in large square compounds, the walls of which are sometimes 20 feet high, and built of sun-dried bricks. The round houses, called katambas, are built of clay, and the conical roofs are made of grass. The entrance to one of these compounds is very intricate, one having to pass through several of these katambas with a doorway on either side leading into a courtyard, where the dwelling-houses are contained. These round houses, standing out from the square compounds, give them much the appearance of ancient castles. The streets are generally broad and clean, with here and there fine squares, in the middle of which are mosques surrounded with fine banyan trees, and in the town are several large markets where fresh meat, milk, vegetables, and articles in general use, from country cloths to native sandals, may be bought at a moderate price. The people are industrious, smelting their own iron, and working it up into articles of general utility; they grow and card their own cotton, weaving it into cloths of various patterns, and they have extensive dyeing establishments. Some are employed in melting glass and shaping it into ornaments for the arms, or in working brass, copper, and leather into ornamental and useful articles. There are also great numbers of barbers, who sit in their shops, and will shave a man's head or face and cut his nails for the consideration of a few cowries. Education is very generally enforced, for nearly every boy can read and write Arabic, having been taught in one of the numerous schools of the town. There are regular courts of justice, presided over by judges properly appointed, who, as well as I could observe, administered the law righteously, in keeping with the statutes and precepts of the Koran, Mohammedanism being the national religion. Theft, however, is punished with severity. For light crimes a hand is cut off; another mode is to sell the culprit into slavery; but the most severe form is to behead the thief, and stick his head on a pole in the market-place, as a warning to others.

King Omuru, the Emir of Nupè, is a pleasant-looking man, about 55 years of age, somewhat stout, moderately tall, very intelligent, and of an inquiring turn of mind. He will sit for hours listening to information concerning the wonders of European civilisation. I learnt that he is not a blood-relation of his predecessor, King Massaba, but was formerly his chief war-captain. The circumstances which led to his accession, instead of Massaba's children, are somewhat romantic. Massaba had sent Omuru to Kano to settle some troubles; during his absence a chief of Kambari rebelled, and drove Massaba and his people from the town of Rabba, the old capital of Nupè, in which place the old kings are buried. The king fled for protection to Illorin. Omuru found the country, therefore, in a very unsettled state when he returned from his expedition to Kano, and immediately summoning his warriors, attacked the rebel chief, drove him to the banks of the Baku, near Wanagu, where, rather than perish by Omuru's sword, he leaped into the river and was drowned. Order and peace being restored, Omuru invited Massaba to resume his throne. The king was so grateful for the service thus rendered, that he commanded that Omuru should succeed him without molestation from his sons. On assuming the title, he established the present capital of Nupè, and called it Bida, which means in the language, "Follow me." He appears to rule his people with firmness and wisdom, and to the extreme borders of his kingdom his power is respected, and there is safety for the stranger. I had an opportunity of witnessing the popularity of Omuru when, on a Friday, he invited me to accompany him to the mosque. He appeared gorgeously dressed, riding a beautiful horse, a present from the King of Houssa, an umbrella being held over his head as he rode, attended by about one hundred horsemen, his body-guard and chiefs, all gaily dressed. In front of the king's horse a man walked, throwing cowries to the crowd, for which they scrambled. The populace crowded the thoroughfares, got upon walls, and occupied every available space, and on the approach of the king prostrated themselves in the dust and shouted "Baba! Baba!" (Father!) The greatest enthusiasm was shown both on going to and returning from the mosque. As the king's stranger, the place of honour was allotted to me; I rode next to the king. After prayers in the mosque, the king met his chiefs in a house close by, ate kola-nuts with them, and introduced me to the company. In short, the greatest loyalty and enthusiasm were manifested by all, and I confess I was myself impressed by his kingly bearing and friendly manner.

On October 25th I left Bida for Illorin, in the Yoruba country. Our journey was south-westerly, through a charming tract of country, undulating in character and sometimes closed in with hills, ranging, I estimated, from 500 to 1000 feet in height. There were extensive farms of cotton, maize, guinea-corn, and garo, and in the marshy ground near Dokomba there were large rice-fields. Partridges, guinea-fowl, and crown-birds are plentiful throughout this region.

Dokomba, situated on the river Lavon or Kaduna—the former being the Tapa, and the latter the Houssa name—about 18 miles from Bida, is a very dirty and over-crowded town, containing a population of about 5000.

From Dokomba, we descended the River Kaduna, in native canoes, furnished by order of King Omuru. At the canoe-village of Dokomba the river flows south-westerly, and is about 100 yards broad, and generally widening to a quarter of a mile till reaching Muraji, where it enters the Niger. The river flows through the ancient territory of the Tapas, the ruins of whose towns may be seen upon its beautiful banks. The sand-banks abound in pelican, crown-birds, duck, plover, and other birds of beautiful plumage. The stream is navigable for steamers of light draught to the town of Dokomba. The journey from Dokomba to Muraji was accomplished in eight hours and a half, and may be reckoned at 30 miles.

Muraji is a closely-packed town situated on three low-lying islands, containing a population of about 4000. The chief of the town is called the Kuta, and has been recently punished by Omuru for his ill-treatment of a European trader belonging to the European factory, which has been since deserted on this account. With native mats, bamboo poles, and canoe paddles, we erected a temporary tent, under which I passed part of the night. It being moonlight, there was not much sleeping with the inhabitants, but the night was passed by them in playing, singing, and dancing. The Kuta seemed to be having a specially grand time, and, as I could not sleep, I walked to his compound to see and hear all I could. To my surprise, I found it was the Kuta's fashion of holding a levée. Drummers and performers upon bones were gathered round in a circle playing native tunes, to which the honoured guests danced. The master of ceremonies stood in the midst, and as each one was introduced spoke in his praise, and dilated upon his great deeds, after which an extemporised song was struck up in his honour, to which he danced, prostrated before the chief, and retired. A man newly appointed as chief was introduced, and was reminded of his duty to the people, and warned to deal righteously with his subjects. The Kuta and his sons danced, striking out with hands and legs most vigorously, and evidently enjoyed the excitement. Something was said in my praise, and the

Kuta presented me with six pots of shea-butter as I had honoured him with my presence, and had witnessed his dancing.

Early next morning we exerted ourselves to obtain a canoe and men to take us the remainder of our journey, but did not succeed in starting till 8.30 a.m. Our general course was north-west by the inner channel of the river Niger, here called by the Yoruba name Oya. The canoe-men, to keep out of the current, passed through the long grass covering the level plains now flooded with water, and only occasionally striking the river proper. The journey was an excessively trying one, arising from the constrained position that one is obliged to keep in a canoe, and from mosquitoes, sand-flies, bad food, the delays caused by the men stopping at every village and trying to pillage, and by losing our way and sticking fast in large rice-fields; but at midnight of the fourth day we arrived at Shonga-wharf, where we were well received by the agent of the United African Company, and entertained at their factory.

From Muraji we passed the following villages, at short distances from each other, viz.:—Ajuka, Lanifa, Adafo, Esunlatchi, Gogah, Latchi, Dokko, Woïski, Kasoji, Kuson, Konji, Pashea, Ipaji, Bonfofo, and Shonga-wharf.

Shonga is situated upon the lowermost branch of the river Niger, almost due south from Rabba, but is not marked upon charts or maps. There are two distinct towns, one to the east near the river, known as Shonga-wharf, where all the trading factories are situated, and under the absolute control of the Emir of Nupè, who collects all customs from the place. The town of Shonga, about half a mile west of Shonga-wharf, is walled and ditched, with a population of about 5000, and has a king whose name is Aliyu, who rules with limited power, being tributary to the Emir of Nupè. Rising behind Shonga-wharf are two hills, measuring 450 feet above sea-level. To the west of the town, a range of hills strikes southerly. As none of these hills are marked on the chart, I have taken the liberty of naming the most easterly "Gregory's" Mount; the next "Kilner's" Mount; and the range to the west of the town, "Punshon's" Mount. The town is 450 feet above sea-level, and is situated upon the slope of a hill, the highest point of which is 650 feet above sea-level. These hills overlook the beautiful valley of the Niger, now appearing green with the rice-fields laid out in plots, marked off by streams of water trickling between like silver threads.

From Shonga these are the following chief roads, viz.:—To Illorin, in a general south-westerly direction, about 118 miles; to Lafiaji, in a southerly direction, two days' journey; and to Rabba, in a westerly direction, taking ferry at Kusaji.

On November 5th, we left Shonga for Illorin. We passed out of the Illorin gate and over Shonga Hill, which makes a rapid descent after reaching 650 feet above sea-level, when again we ascended to the height of 650 feet, at a distance of about 10 miles from Shonga, where is situated a small town, surrounded with a wall now sadly out of repair, named Idumaji. From this place a gradual descent is made till reaching the river Bandana, 16 miles from Idumaji, flowing south-easterly at the ford, and being 2 feet deep by 20 feet broad. From this valley a gradual ascent is made till the aneroid indicates 1000 feet above sea-level. A descent is then made to the river Epwa, 2 feet deep and 10 feet broad, about four miles from Bandana. From this valley a gradual ascent is made till reaching the town of Sharè, sometimes called Sharegi or Sariki, 10 miles from the river Epwa. Besides the above, we crossed several streams flowing south-easterly, dried up part of the year, but of considerable depth in the rainy season. We passed through numerous farms, cultivated with guinea-corn and garo. The shea-butter and locust trees grow in abundance by the wayside. The rocks generally are of ironstone, and occasionally granite shows up to the surface. The path in some places is so thickly strewn with mica, small pieces of quartz, and rounded pebbles, that the horse was much distressed in walking over it.

Sharè is a walled town beautifully situated at from 1000 to 1100 feet above sea-level. From the north-west round to the east of the town is a range of flat-topped ironstone hills, about 300 feet high, up the slopes of which the town is creeping. Away on the distant south-eastern horizon blue mountain ranges stretch out for miles, whilst the rich level ground between is green with guinea-corn or tall grass, the whole making up a view of the grandest description. We found an invigorating and refreshing breeze blowing over the town, whilst from the hill Oke-awon, rising out of a limestone bed, enclosed with a large plantation of trees, and made sacred as a fetish grove, flowing easterly through the midst of the town, is the river Shawsay, which supplies the inhabitants with an abundance of pure water for drinking and domestic purposes. This river, I was told by the inhabitants, flows into the river Oye, which in its turn empties itself into the Oya (Niger), and from the height of the banks must be ten to twelve feet deep in the rising season, and is so swift that it can only be passed by the native bridges thrown over some very narrow parts where the river has worn the rocks into a deep chasm. The physical peculiarities of this town mark it out as a healthy spot; and I imagine Europeans might reside here with little or no danger to health.

Its political relations are peculiar, it being the border town of the Nupè and Yoruba kingdoms, and regarded by both as neutral ground, although as a matter of right it is claimed by the Emir of Nupè, who has a consul living in the town named Galajema. There is a chief called by the people king, but I suspect his power is extremely limited, probably less than that of the rich prime minister, Adek-eye, and as nothing can be done without consulting the king, the consul, and the prime minister, who in their turn will do nothing of importance without consulting the inhabitants, it becomes a slow and costly proceeding to obtain one's wishes, and requires some skill to prevent jealousy.

From the hills may be seen the Nupè portion of the town, with the round katambas well marked and separate from the Yoruba portion, which has its characteristic compounds, the latter portion being by far the larger. I estimate the population at from 25,000 to 30,000, one-third only being Nupè. The religion of the town is that represented by the two tribes, the Nupè affecting Mohammedanism, but mixing with it superstitions and heathenish rites; whilst the Yoruba pays homage to the numerous gods of his nation.

From Sharè important roads lead to the following places, viz.:—To Odi in a south-easterly direction; to Illorin in a south-westerly direction; to Lafiaji in an easterly direction; to Baraba (Barga) in a westerly direction; and to Shonga in a north-easterly direction.

After leaving Sharè the road becomes very undulating and rough, unavailable for wheeled traffic, and difficult even for horses. We crossed several small streams, all flowing south-easterly, and I was informed that they emptied themselves into the river Oye, not marked upon the chart. The principal of these are as follows, with their distances as nearly as I could judge:—Kaja, one mile from Sharè; Abba, two miles further on. The ascent from this stream over the granite rocks of Abbageaji hill is troublesome. Obere, three miles; Olushi, three miles; Ahau, three miles; Lokotododo, three miles; Ologoji, four miles, with a village of the same name; Boddé, five miles, with a small market on its banks. After leaving this stream the ascent is difficult over the Ode Boddé Hill, as huge pieces of granite rock stand out from the surface, worn quite smooth by exposure. About six miles from Boddé is situated the town of Akpado, on the slope of a hill, about 1400 feet above sea-level, the road winding around its base measuring 1100 feet above sea-level. At this place the numerous caravans rest for refreshment, the people of the market finding a ready sale for country soup, boiled yams, and fruits.

From Akpado the principal roads are the following, viz.:—To Shonga in a north-easterly direction; to Illorin in a south-westerly direction; and to Ireshi in an easterly direction.

The next place of importance is Iporin or Sansani, marked on the chart Kpani, about six miles from Akpado. The town, 1000 feet above sea-level, with a population of about 3000, is beautifully situated on the slope of a hill named Oke Popo, to the west of which is another hill named Apaykun. At the base of the hill, flowing round the town with an easterly course, is a small stream named Iporin. I was told by a native that it flows into the Popo, which empties itself into the Kanja, which in its turn flows into the Oye; the latter river flowing round the base of Mount Papala about 10 miles to the east of the town of Iporin. I learn from the natives that the river Oye is a large river, and judge that it must be so from the number of streams said to flow into it, and that it takes its rise in Mount Kolli in the Effou country, and taking a general north-westerly course empties itself into the river Niger, a short distance to the west of Shonga. At night and early morning the thermometer went down to 68° F. inside the house.

The following principal roads strike off from the town, viz.:—To Shonga, north-east; to Illorin, south-west; to Abayiji, east.

From Iporin the road becomes excessively rough, being in some places over large blocks of granite so steep and smooth as to make it dangerous, and in other places the stones washed down from the hills caused the horse to limp along cautiously. Huge granite boulders stand out on either hand, and there were the usual farms of guinea-corn and garo, and the shea-butter and locust-trees; the notes of the partridge, guinea-fowl, and other birds were frequently heard.

After crossing the river Iporin, we passed Oke Obba, a small farm-village about four miles distant. About eight miles from this place is the river Oshin, flowing south-easterly, 30 yards broad and three feet deep. On the southern bank is situated the town of Oshin, with a population of about 1000. Six miles further on, on the top of a hill 1200 feet above sea-level, is situated the large farm-village of Okeoye, containing a population of about 1000. In a valley six miles distant is the river Ori. Six miles nearer Illorin is the farm village Oke Oshi, with a population of about 500, situated on the top of a hill 1450 feet above sea-level. From Oke Oshi to the river Onya, about 30 yards broad and two feet deep, the distance is five miles. The country is now very undulating till the village of Pulanji is reached, four miles from the river Onya, on the top of the hill Obanikinsuwi, from the summit of which a good view may be obtained of Illorin. A prominent object to the north-west of the town of Illorin is Mount Sobè, a bare, black granite rock, marked on the chart as being 250 feet high. One is also struck with the wonderful bareness of the country all round the town for miles, there being scarcely a single tree to be seen. Passing down the hill-side, our course lies through a swamp. Three miles from Pulangi, flowing north-west at the ford, 30 yards broad and three feet deep, is the river Aza, said to take its rise in the village of Eraza, 30 miles to the south of Illorin. From this river a gradual ascent is made for about half a mile, when the gate of the town of Illorin may be entered.

The whole distance from Shonga to Illorin I estimate at a little more than 118 miles, which took us nearly four days to accomplish. Illorin is one of the largest towns in the Yoruba country, the chief town of the northern portion formerly wrested from the Yorubas by the Fulah power. It is surrounded by a high mud wall and deep ditch, and is supposed to contain a population of 150,000. It is situated upon a range of hills, 1000 feet above sea-level, and covers a large space. Besides the river Aza, which partly surrounds the town, a small stream flows through the midst of it in a south-westerly direction, named the Salioluku, which is a running stream all the year round, but in the wet season is over three feet in depth. The population is composed largely of Yorubas, the remainder being Nupès, Fulahs, Houssas, and Kanikis, the king himself being of the last-named tribe.

The following are the chief roads from Illorin, viz.:—To Ajasha, south-easterly; Owo, easterly; Shonga, north-easterly; Ogbomosha, south-westerly; Banja, westerly; Ondoko, north-westerly.

The national religion is Mohammedanism, but we found a great deal of superstition and covert heathenism; and if one might take this town as an example, Mohammedanism is certainly little or no improvement upon heathenism as far as it affects the life and morals; the grossest lying and deception is practised without shame, and the licentiousness of the people is unbounded, extending even to little children. The people are unclean and idle in their habits, but to this there is some exception, as cloth and tobes of great value are woven in the town, and there are workers in metal and leather. The men pride themselves on their skill in horsemanship, and in the use of the spear and sword, which are their weapons of war. I judge the town to be in a state of moral decay, and there are so many signs of weakness that I suspect it would become an easy prey to a determined and courageous foe.

The present government of the country seems to be that of a limited monarchy, the king not daring to act in any matter of national importance without consulting his chiefs. The army, represented by the war-chiefs, seems to have a large share in the government of the country.

The present king is named Aliyu, and, to distinguish him from the king of Shonga, who bears the same name, he is called Aliyu-Dan-Shita, i.e. Aliyu, the son of Shita. In personal appearance he is not very imposing, being small and short of stature; but he has the credit of being intelligent and wise. He is of the Kaniki tribe, as above stated, and just now does not appear to be very popular with his subjects, especially on account of a difference of opinion with the commander of his army respecting the war now waging with the town of Offa, about 60 miles to the south-east, and said to contain a population of 25,000; the king being opposed to the war, whilst the chief is determined to carry it on, the country being therefore divided into two powerful factions, the majority being in favour of the war. The history of the origin of this war reaches back to some distant date. The town of Offa, by conquest, was tributary to Illorin; but the inhabitants, being Yoruba, received constant taunting messages from the powerful and warlike Ibadans for submitting to the Fulah stranger who had come across the Niger and taken their country, and, receiving encouragement from Ibadan, determined to throw off the yoke. The like taunts seem now to be bearing fruit in Illorin in the disloyalty and factious spirit manifested, and in the return of great numbers of Yorubas to Ibadan.

Offa began cautiously, and did not at once break out into open rebellion; but sent a request to Illorin that the tribute might be remitted for one year, to enable them to build a wall round their town to protect them from the attacks of robbers, especially as they were so far from those to whom they were supposed to look to for protection. The bait took, permission was given, and the wall built. The year following the usual tribute was required; but the Offas, now fortified with a wall, refused to pay, whereupon the Illorin army laid siege to the town; but the Offas, being helped by the Ibadans, have succeeded not only in keeping the Illorins at bay for nearly two years, but have inflicted upon them several severe defeats, and have added a fourth wall to their town. Though the Illorins persist in their determination, they seem to be further from attaining their object now than when they began.

The king received me and my party very graciously at the palace on several occasions, and took an intelligent part in many conversations with us. His manner of receiving us was purely Yoruba, the people of which country being particularly careful to shroud the person of their sovereign in a mysterious secresy. The king was lying in a room with his head out at a small doorway, about three feet high and eighteen inches wide, opening into the piazza where we sat. This opening has a mat hanging over it, which is partly lifted when he receives visitors, but let down when the interview is over or the king is not to be seen.

The palace is situated in the midst of a large square compound, after the Yoruba fashion, built of mud and covered with grass, a somewhat better house than the ordinary town residences. There are many large markets in Illorin, and food is plentiful and cheap. Slavery prevails, but the fact of being a slave is not necessarily a mark of poverty, as many slaves are so rich as themselves to possess numerous slaves, horses and cattle of their own, and extensive farms, lands, and houses. A slave in irons being led with a rope round his neck is a common sight on the roads, and both in Bida and Illorin I saw the slave marts crowded with hundreds of slaves. Apparently the one object of war with the mass of the people is to capture slaves.

The chief languages spoken from Bida to Illorin are Fulah, Houssa, Nupè, Kaniki, and Yoruba; but, as an interpreter, I imagine a Yoruba would be found the most useful. Little difficulty is experienced in obtaining carriers, as the Kambaris, a large tribe of strong, muscular men, follow this as their profession, and will carry a load of 70 lbs. or 80 lbs. from Shonga to Illorin for five or six shillings. Horses may be bought at a moderate price in the country, and if salt, cloth, or beads can be obtained for barter, they may be purchased very cheaply.

The disturbed political state of the country prevented my passing to Lagos overland, which was my original intention, Lagos being only fifteen days' journey from Illorin, viâ Ogbomosho, Ibadan, and Abeokuta.

The natives told me of a river named Moro, which they exalt into a deity. It rises at Agbanda, 30 miles south-west of Illorin, flowing into the river Amon, which in its turn flows into the Niger. It flows by a town named Sawo, 10 miles from Illorin, at which place it is said to be about the same breadth and depth as the Aza at Illorin, in the month of November, i. e. 30 yards broad and three feet deep, and in the wet season becomes very broad, swift, and deep.

On this river in the month of June a yearly festival, named Moro, after the river, is kept by the heathen of the country. They spread skins and mats of different colours across it, making them fast to the banks, so that they may not be washed away, and offer annual sacrifices to the river. One year it demanded a bullock as a sacrifice, which the people refused to give, and, as the tale goes, the river got angry and washed away the skins and cloths. About the same time a Shango priest was drowned in the stream, whereat the thunder-god Shango became angry and declared war against the river. The encounter was furious, but was decided by Shango casting down a thunderbolt into the stream. The commotion caused was so great that a bank of sand was formed in the middle of the river, upon which great numbers of country pots washed down by the stream rested, and the water flowed in exactly opposite directions on either side of the bank, but when the fight was over the stream flowed on, and flows now as before the great contest. Such is the native story, firmly believed in.

Many rivers and towns were named to me not marked upon the chart or any maps that I have seen, which leads me to think that an intelligent traveller would find here an interesting field for discovery.

The way overland being closed to me I was obliged to return to the coast by the way I came. I found the Niger strangely altered in appearance; the villages and towns that were surrounded or covered with water on my way up, were now standing high up on banks from 20 to 30 feet above the surface of the river, and the channel in some places had only five or six feet of water, making our progress very slow and precarious.

I left Shonga in the trading steamer *Fulah*, belonging to the United African Company, on the 30th December, and arrived in Lagos on the 24th of January, 1880, having been absent, in all, 164 days.

FINAL REPORT OF THE EXECUTIVE COMMITTEE OF THE AFRICAN EXPLORATION FUND.

THE following Report of the African Exploration Fund Committee, summarising its proceedings from the commencement and recommending the closing of the Fund, has been adopted by the Council of the Society, and issued to the subscribers to the Fund.

ROYAL GEOGRAPHICAL SOCIETY,
LONDON, 1, SAVILE ROW, W., *December 6th*, 1880.

The Committee of the African Exploration Fund appointed by a Minute of Council, dated March 12, 1877, submit the following Report of their proceedings and the results obtained, for the information of the Council and the contributors to the Fund:—

The Circular issued by the Committee, dated May 16th of that year, fully set forth the object with which a Fund was formed, to be held entirely separate from the general income of the Society. Towards this the Council contributed a sum of 500*l.* as a first grant.

The Committee proceeded at once to appeal to the public for means to prosecute such Explorations as might best promote objects which had enlisted on many occasions the warmest sympathy of the nation; and they announced their intention to begin with such funds as they had in hand, and to persevere to the extent which these and further contributions would allow.

His Royal Highness the Prince of Wales was pleased to honour the Fund by becoming its Patron; thus marking his approbation of the design of the Royal Geographical Society and their Council to aid the enlightened efforts of the International Association, established in 1876, at a Conference of Geographers held at Brussels under the auspices of the King of the Belgians, for the systematic and continuous exploration of Africa.

After a careful survey of what had been accomplished already, as roughly indicated in the sketch-map accompanying the Circular giving the various explorations made in the interior by previous travellers, and of all that still remained to be done in so large a field, the Committee decided that they might usefully undertake, as their share of the common work, the exploration of one of several routes from the Eastern Coast through new country to the great lakes of the central region, such an undertaking promising the greatest practical results within the compass of such means as they could command.

The scientific exploration of a portion of Central Africa, with a view to ascertain the best means of reaching the interior from the Eastern Coast, having been thus defined as the object to be attained, the selection of one out of many possible routes speedily followed, and that which in the Circular was marked Nos. 3 and 4 was chosen as the best to attempt with the means at their disposal. This route led from the Eastern Coast at Dar-es-Salaam to the North end of Lake Nyassa; and from thence, across a wholly unexplored region between it and the South end of Lake Tanganyika. Assuming the practicability of both routes to be ascertained, two missing links in the geography of this almost unknown region would be supplied. A route from the East Coast to the North end of Nyassa, although reported to exist as a highway for slave caravans, had never been followed by European explorers; while the connection between the two lakes lay over a totally unexplored country.

To accomplish this useful work—as the contribution of the Royal Geographical Society to the larger scheme of the International Association for establishing a main line of communication from the East to the West Coast across the whole Continent, and erecting stations at certain distances along this extended route—an expedition on a very modest scale was organised by this Committee and sent out to Zanzibar in the Autumn of 1878. Mr. Keith Johnston, so well and favourably known as a scientific geographer and experienced traveller, was selected as leader of the expedition, and Mr. Joseph Thomson was attached to him as geologist and general assistant. This expedition, after having been carefully organised at Zanzibar, with the active assistance of Dr. Kirk, our Consul-General, took its departure for the interior under the most favourable conditions on the 15th May, 1879. The Sultan of Zanzibar lent his own steamer to speed them on their way to Dar-es-Salaam, whence, according to the report of a most competent authority, in the person of our Consul-General, "a better organised caravan never left the coast for the interior."

The Committee have had but one cause of regret in the whole conduct and issue of this expedition, one of the most successful and satisfactory in every particular that is on record—the loss by death of its enthusiastic and able leader, who died in the midst of his labours on the 28th of June, at Behobeho. The loss to the expedition, and indeed to geographical science, was very grievous, and is most sincerely deplored by the Committee. In the face of such a calamity it might well have happened that the expedition would have suffered a total collapse, and nothing have been accomplished. But fortunately Mr. Thomson, notwithstanding his youth and comparative inexperience, proved in every sense a worthy successor, and to his energy, courage, and tact, is due the entire success of the expedition, which has returned after fully accomplishing all the objects contemplated in its despatch.

It is unnecessary for the Committee to give any detailed account of the progress of the expedition, after the reading at the meeting of the Society of November 8th, and the subsequent publication, of Mr. Thomson's excellent paper, giving a narrative of all its successive stages. But, quoting the words of the President, Lord Aberdare, at the meeting, "one fact of great interest and importance might be mentioned, as it is not contained in Mr. Thomson's paper; it is this, that Mr. Thomson traversed no less than 2830 miles of country during these explorations, and of these upwards of 1300 were over entirely new ground."

It only remains to render an account of the funds placed at the disposal of the Committee. The total amount contributed to the Fund since the commencement, it will be seen, amounts to 3989*l.*, of which 2000*l.* was the grant of the Council. The expenditure has not quite exhausted the sum, but the enclosed extract from the Minutes of the last meeting, Nov. 15, 1880, of the African Exploration Fund Committee, will show that the Committee desire this remaining balance should be utilised: 1st, by a grant of 250*l.* to Mr. Thomson, to mark the sense entertained of the valuable services rendered by him during the two years that he has served the Society, without salary or remuneration of any kind, in bringing to a successful termination a most arduous and trying expedition to the entire satisfaction of the Committee. It has been carried through, not only as Lord Northbrook, the late President, told the Society, "with great courage and determination," but with remarkable economy and efficiency, without the loss of a single bale of goods, or a single porter by desertion, and without once drawing a trigger in anger, or any hostile collision with the natives, a still rarer achievement of African exploration. 2ndly, in the purchase of a sword of honour and a silver medal for Chuma, Mr. Thomson's headman, well earned by his unwavering fidelity and the value of his services; and a second-class sword to Makatubu, second headman of the caravan, together with a silver medal and a certificate. 3rdly, a bronze medal to be distributed to each of the 150 native followers, as an acknowledgment on the part of the Society of the excellent conduct of the servants of the expedition, and as an encouragement to those who may be engaged in any subsequent explorations.

Your Committee cannot close this Report without bearing their testimony to the constant interest manifested and the invaluable assistance rendered throughout the whole progress of this expedition by Her Majesty's Consul-General at Zanzibar, Dr. Kirk. They have no doubt that to his influence and assistance much of its success has been due, and they trust their President will be authorised by the Council to convey in an autograph letter their best thanks and sincere acknowledgment of the service rendered.

The objects of the expedition having been accomplished, and the funds placed at their disposal exhausted, your Committee think the time has arrived to surrender the trust confided to them, and therefore they now recommend that the accounts of the Fund be closed and audited, and that the present Committee be dissolved.

RUTHERFORD ALCOCK,
Chairman.

BALANCE SHEET OF THE AFRICAN EXPLORATION FUND, MAY 1ST, 1877, TO DECEMBER 14TH, 1880.

1877-80—Receipts:—	£	s.	d.
Donations by the Royal Geographical Society, four grants of 500*l*. each..	2000	0	0
Donations and Annual Subscriptions by the Public, and Sale of Circular	1989	18	1
	£3989	18	1

1877-80—Payments in England:—				£	s.	d.
Contributions to International African Association	£250	0	0			
Advertising and Meetings	88	4	10			
Printing and Maps ..	127	16	9			
Outfits, Passages, and Allowances to Members of Expedition	698	4	2*			
Stationery, Postage, and other Office Payments	172	2	6			
				1336	8	3
Payments in Zanzibar:—						
Dr. Kirk's Drafts				2463	0	0
				3799	8	3
Balance of Fund, including a sum of about 180*l*. still to be drawn by Dr. Kirk to close accounts at Zanzibar ..				190	9	10
				£3989	18	1

Audited and found correct,
December 15*th*, 1880.
(Signed) S. W. SILVER, } *Auditors.*
(„) C. WESTENDARP, }

* This includes the grant of 250*l*. to Mr. Thomson, mentioned in the body of the present Report.

EXTRACT FROM THE MINUTES OF THE AFRICAN EXPLORATION FUND COMMITTEE, NOVEMBER 15, 1880.

Confirmed by the Council of the Royal Geographical Society, Nov. 22, 1880.

The objects of the expedition having been satisfactorily accomplished, it is recommended that the accounts of the Fund be now closed and the Committee dissolved, and that in consideration of the ability and completeness with which Mr. Thomson has carried out its objects and the valuable work he has accomplished, the sum of 250*l*. be granted him as an honorarium, out of the balance of the Fund.

Also that a sword with a suitable inscription and a silver medal be presented as a testimonial to Chuma, the headman of the caravan; a second-class sword and a silver medal to Makatubu, second headman, and a bronze medal and certificate sealed with the Consular seal to each of the 150 native followers; as an acknowledgment on the part of the Society of the excellent conduct of these servants of the expedition.

It is further recommended that Lord Aberdare, President of the Society, be requested to write an autograph letter of thanks to Dr. Kirk for the great services he has rendered throughout to the expedition; and that Sir Rutherford Alcock be asked to draw up a Report on the termination of the Expedition and the closing of the Fund, which Report, on being approved by the Council, should be printed in the 'Proceedings,' and copies of it sent with the balance-sheet, together with a copy of Mr. Thomson's account of his journey, to all Subscribers to the Fund who are not Fellows of the Society.

GEOGRAPHICAL NOTES.

Lake Tanganyika.—Mr. E. C. Hore writes to us as follows regarding the still unexplained phenomenon of the long-continued rise of the waters of this lake, and the reopening of the Lukuga outlet which he was the first to witness two years ago:—

"No *local* reports," he says, "are to be obtained anywhere on the lake more reliable than those at Ujiji. These reports go to show that when Cameron was here, a marked rising of the lake waters had already been observed, and that it continued from that time up to about two years ago, when the surface was eight feet higher than in Cameron's time. From that date (i. e. two years ago) I have observed that the waters are gradually retiring, and this at a very regular rate, except during the rains (when, however, there is no rise). Three months ago the Arabs agreed in telling me, '*Now* the lake is the same as when Cameron was here.' The partly submerged palm-tree on which I had fixed a water-gauge was then just left dry, and the Arabs told me that Cameron used this tree as a target, and that it was then just at the water's edge. Now all my observations and the reports I hear lead me to believe that the lake has been gradually rising for years, and that it rose until it burst open the Lukuga obstruction, first oozing through in small quantities, as when seen by Cameron. That the waters should now rush through the Lukuga instead of gently overflowing, is probably due to the first burst having eroded a deeper channel; for, according to the geological nature of the Lukuga gap, so will the waters cut a deeper and deeper chasm, or eventually find a permanent level, and gently flow over a rocky sill. I cannot think that there could have been, just before the late bursting of the Lukuga, any more than a mere trickle of water through the obstruction there, and that of periodical occurrence and of but small account as a drainage of the lake. But what is still unaccounted for is this: before the time of Cameron's visit this periodical rising must have been infinitesimal, if any, compared with that of the few years immediately preceding the bursting of the Lukuga, or we must do away with the ancient character of the lake. I am convinced that the lake never (or at any rate, for very many years) was at such a height as it was two years ago. This is quite apart from any geological evidence of a different state of things in remote ages. And I cannot believe that the lake has always been rising at this rate. Now, how is it that this enormous quantity of water could rise so quickly in spite of that evaporation which has (as is supposed) been sufficient for ages to maintain it almost at a level. A succession of extraordinary rainy seasons, of which we have no evidence, would not account for it. I can bear testimony to an enormous *evaporation*, but how is it that the waters suddenly gained upon the evaporation as they had never before done?"

Mr. Hore seems disposed to connect the changes of water-level with earthquake movements. At the time of writing (September 13th, 1880) the house in which he resided was shaking with earthquake, as it had been for several days before that date. He says, "The shocks cause the whole house to vibrate; the roof, a structure of beams, poles, and reeds, covered with earth, creaking like a huge basket." Some years previous, according to one of his Arab informants, there occurred an extraordinary disturbance of the lake waters, a long line of broken water being seen, like a reef, bubbling, and reeking with steam. The next morning all was tranquil, but the shore was strewn with masses of a substance resembling bitumen, specimens of which Mr. Hore had secured to bring with him to England.—Mr. Hore has sent home to the London Missionary Society an excellent map of the southern end of the lake, plotted during his cruise last spring in the *Calabash*. Latitude by stars N. and S. was observed at twelve different places, and the coast-line between them laid down by compass bearings.

New French Missionary Expeditions to Central Africa.—The Archbishop of Algiers, who, as we have before recorded, was charged in 1878 with the organisation of two missionary expeditions to Lake Tanganyika and Lakes Victoria and Albert,* has recently had confided to him the arrangements for two more missions which are to be established in the heart of Central Africa. The headquarters occupied by one of them will be at the most northerly point on the Upper Congo, while the other will have its central station at Kabébé in the territory of the Muata Yanvo. The missionaries for the former will ascend the Congo to their destination, while those for the latter will go by way of Lake Tanganyika.

Survey of Eastern Shore of Lake Nyassa.—We learn from Dr. George Smith that the Livingstonia Committee of the Free Church Foreign Missions have ordered a survey to be made of the east coast of Lake Nyassa, with the object of searching for a good harbour and a healthy station among the mountains or on the plateau. The survey is to be undertaken, in the *Ilala*, mission steamer, at the close of the rainy season in June next. Meanwhile, the Rev. Dr. Laws, head of the mission, has made a preliminary expedition to the north-east end of the lake. He writes (on the 30th September): "I went in the steamer to search for some suitable harbour along the base of the Livingstone Mountains. Not a single place did we find until we came to their southern end, or rather the southern end of that part where they abut on the shore of the lake itself. Here was found a large bay, where there is good anchorage. It is nearly opposite Florence Bay. I am happy to say that my conjecture of 1875 that coal would be found there proved correct. We found it on the beach, and I traced it up a stream. On our way back we also found coal at Kambwe, on the beach. Two natives agreed to go with me to a place where they said it was in the hills, about six hours distant, and had we been staying longer, I should have gone there. Of this journey more fully in my next. We brought Mr. J. Moir down with us again; also a cow, a calf, and a young elephant caught at the north end of the lake. It is now doing well. . . . We had some stormy weather on the voyage, and this has brought, as usual, an attack of fever with it."

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* See vol. i. pp. 453, 513; vol. ii. pp. 43, 691, 765.

The River Okavango.—In addition to his general observations on Ovampo-land,* Père Duparquet has collected much useful information regarding the river Okavango and the country through which it flows, from hunters who last year ascended it for a long distance, almost indeed to its sources. He says there are three principal waggon-routes from Omaruru to the Okavango; one of these follows the Omaramba Omataku, and leads to Libêbé; the second runs along the Omaramba Ovampo to Ombongo in the country of the Ovakuangaris; and the third reaches the river in the Oshimporo or Okimboro country. Without going into details regarding itineraries, Père Duparquet commences his observations at Libêbé. He would have preferred, he says, to begin his description from Lake Ngami, instead of devoting his attention to the portion of the river between Libêbé and the country of the Amboellas (in about 16° S. lat.), but few particulars were procurable, as, owing to the presence there of the *tsetse* fly, this part of the river is but little frequented. At Libêbé the river is at its widest, and flows with a very rapid current. One day's journey lower down, cataracts, called *nona*, are met with, and after six days more the mouth of the Omaramba Shadom is reached, where the river appears to lose itself in an immense reedy marsh. From this sheet of water flows the river Tuka (Tonke or Teaghe), which is looked upon as the continuation of the Okavango, and falls into Lake Ngami. As, however, the Tuka is much smaller in volume than the Okavango, it is probable that the latter river loses the greater part of its water in the marsh, in which probably the river Tamunakle or Tamalukan takes its rise, but this is not at present absolutely certain. Libêbé, it seems, is the name of the last king of the Ovambukushu tribe, who had his capital there. The tribe in question is the one which the Portuguese call Mucussu or Bucussu, and which is referred to under that name in M. Brochado's narrative, and on the Viscount de Sá da Bandeira's map. To the north of Libêbé, which is the most important place on the whole river, is the Amanbundi country, inhabited by the Bushmen Magogoro, and beyond them to the

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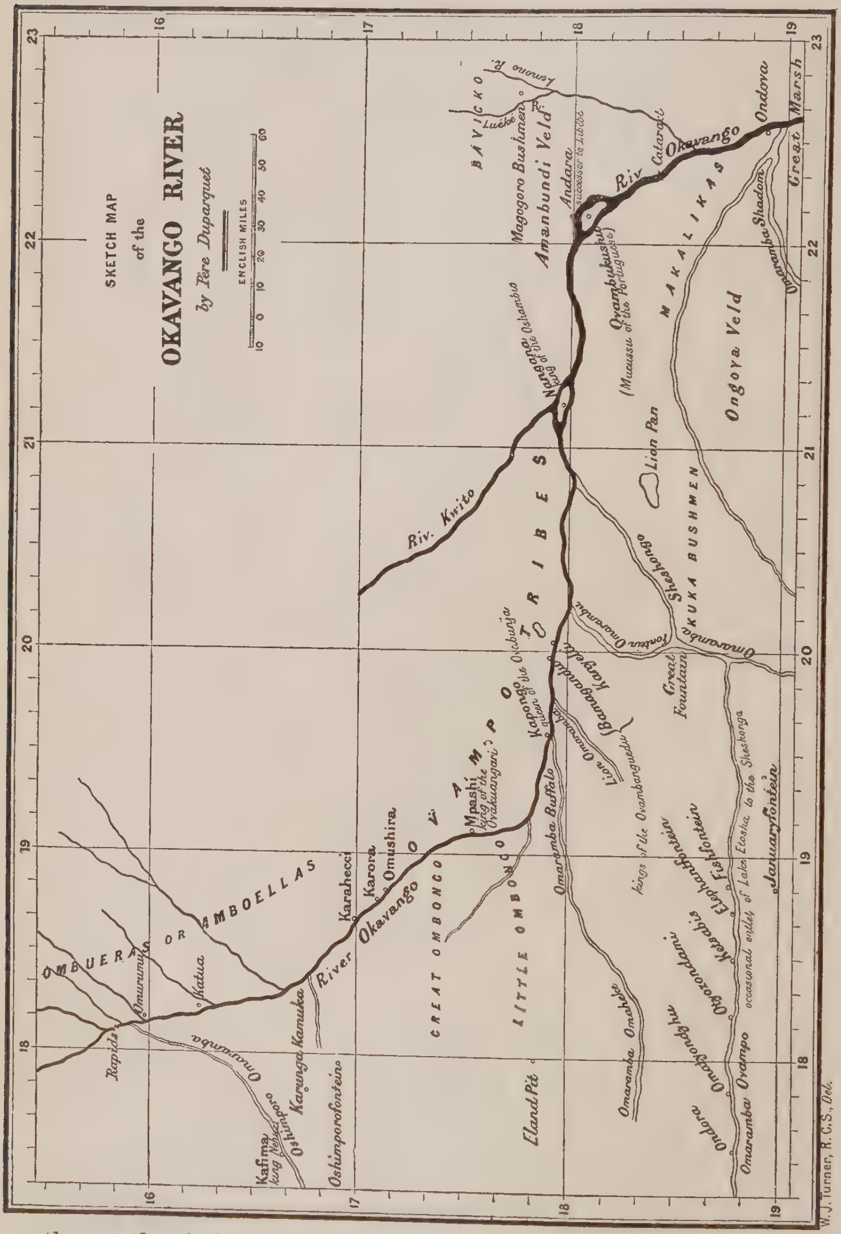
* Proceedings, vol. ii. p. 628.



north-east the Avicko or Bavicko tribe is met with, whose country, somewhat elevated, is watered by the two small rivers Luéké and Lemono, tributaries of the Okavango. As the Bavicko country appears to be the continuation of the highlands of the Amboellas, Père Duparquet considers it probable that these highlands completely separate the Zambesi and Okavango basins, and he thinks that any communication between the Chobé and the Okavango is impossible unless it be by means of the marsh from which the Tamunakle flows, or by that river itself. On the upper course of the Okavango, the hunters all speak of having met with these elevated plateaux, which rise insensibly and by means of successive undulations, so that the country does not present the appearance of being mountainous. English geographers, according to Père Duparquet, make a mistake in confounding the Bavicko tribe with the Ovambukushu of Libêbé; perhaps it is identical with the Darico of M. Brochado and the Portuguese map, but in that case it ought not to be placed on the banks of the river. In other respects, Père Duparquet speaks highly of the accuracy of M. Brochado's information. What that writer says with regard to the River Cuito (Kwito), has also been confirmed by the most recent explorations, as it falls into the Okavango four days' journey west of Libêbé, and is as large, if not larger, than the Okavango. A hunter who visited it last year in March, assured Père Duparquet that after the junction of the two rivers, the stream was three miles broad. At the confluence is an island, occupied by the Oshambio tribe, whose king until lately lived further west on the left bank of the river. This is the first tribe of the Ovampo race met with in ascending the river, and they extend along the left bank as far as the country of the Amboellas. Two short days' journey from the Oshambio is the Ovambanguedu tribe, which has two kings; four days further west the Ovabunjas, ruled over by a queen, Kapongo, who is well disposed towards Europeans; and further west still, comes the Ovakuangari or Ovabuengué tribe. It was in this locality that Mr. Andersson, coming from the south, discovered the Okavango, but Père Duparquet says that the country had long been known to the Portuguese, and named Quangar on their maps. After the last-named tribe come the numerous tribes of the Amboellas, as the Portuguese call them, but whose real name is Ombuéras; they all acknowledge the sovereignty of one principal chief living on the upper part of the river, which has not yet been visited by the hunters. About S. lat. 16° commence the great undulations in the country, rising higher and higher, and forming plateaux, in which numerous rapid streams take their rise. In this part a wide *omaramba* commences, called the Omaramba Oshimporo or Okimporo, by means of which in the rainy season a communication is effected with the omarambas of the river Cunene. These omarambas when united flow towards the south, and run into the great Etosha lagoon or lake. In the years when this lagoon overflows, its waters run eastwards through the Omaramba Ovampo, which is of considerable length, and sometimes through the Omaramba Sheshongo, thus finding their way into the Okavango a short distance above the embouchure of the Cuito. This curious occurrence, however, only takes place in very rainy years. But little information is at present obtainable respecting the country north of S. lat. 16°, where a good-sized river enters the Okavango; higher up another tributary is met with, then some rapids, and lastly a bifurcation formed by two affluents of the Okavango, which are of about equal breadth, but of small volume, and it would therefore appear that the sources of the Okavango cannot be far off.* Père Duparquet accompanies his notes on the Okavango with a sketch-map of its course to the great marsh in about S. lat. 19°. This is given at p. 451 of the present volume of 'Les Missions Catholiques,' and is here reproduced for the information of English geographers.

Survey of Eastern Palestine.—A meeting of the General Committee of the Palestine Exploration Fund was held in the Jerusalem Chamber on November 30th. The chair, in the absence of the Archbishop of York, was taken by the Dean of Westminster. The object of the meeting was to consider the proposed survey of Eastern Palestine. An interesting discussion followed the reading of the resolution of the day by Mr. James Glaisher, the Chairman of the Executive Committee. Mr. John Macgregor (Rob Roy), Mr. Douglas Freshfield, Colonel Warren, R.E., Professor Hayter Lewis, Mr. Eaton, Rev. Dr. Ginsburg, Professor Palmer, and Lieut. Conder spoke upon various topics connected with the country and its survey. It was unanimously resolved that the survey should be immediately undertaken. The Executive Committee are now actively engaged in organising their party, and in making known their objects. The completion of the survey of Western Palestine, and the substitution by the American party of a mere reconnaissance of a portion of the country for the survey of the whole which they originally undertook, made it certain that the Society would take this step. The map of the Exploration Fund as it at present appears is, indeed, only half a map, the whole of the country east of the Jordan being left a blank.

Journey in the Chinese Province of Kweichow.—Mr. Baller, of the China Inland Mission, has lately made a journey to Kwei-yang-fu, the capital of the Kweichow province, from Wu-chang, on the Yang-tsze-kiang, opposite Hankow, in order to take two lady missionaries to the former city. To reach the borders of Kweichow, the party had to travel for more than seven weeks by native boat, but among the mountains of that province the rivers are not navigable, and they were obliged to finish their journey by land. The scenery through which they passed was the finest Mr. Baller had seen anywhere. The road followed ran over high mountains, and as the party crossed some elevated pass, they could see high hills down below appearing like mole-hills; in the grey mornings, before the mist had lifted, their cone-shaped tops were just seen above the clouds lying in the valleys, and Mr. Baller likens the scene to a vast white sea dotted with islands here and there. The condition of the country, however, was deplorable, and contrasted unfavourably with Hunan, one of the richest provinces in the empire; everywhere marks of poverty were seen, due in some respect, perhaps, to the last Miao-tsze rebellion. Mr. Baller noticed that large quantities of opium were grown in the province on the Hunan and Szechuen sides. "It certainly looks very lovely," he says, "the poppy flowers at this time, when they are just in bloom, presenting such varieties of colour; the petals of some were pure white, of others a delicate pink with white edgings, while others were a deep red or crimson, or else a magnificent dark blue." On his way back to Wu-chang, Mr. Baller took a different route, travelling due north to Chung-king on the Upper Yang-tsze.

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* Major Serpa Pinto crossed near the head-waters of the Cubango (Okavango) in lat. 13° S.

Colonisation in the South Seas.—In our June number of last year* we referred to the Marquis de Rays' scheme for founding a colony in the South Seas, and the arrival of the first ship *Chandernagore* at Likiliki Bay in New Ireland. From time to time sinister rumours have been current respecting the ill-success attending the experiment, which appears to have been due to many causes, but news has just been received of the utter collapse of the expedition. The survivors arrived in Sydney about three months ago, and are reported to have been in a deplorable condition, some of them being reduced to mere skeletons by the severe and prolonged hardships which they had undergone. No definite intelligence appears to have been received of the proceedings or fate of the other two vessels mentioned in our previous note.

United States Survey Operations in Neighbourhood of Behring Strait.—Mr. W. H. Dall, of the United States Coast Survey, has favoured us with a few details regarding last summer's work on the north-western coast of America. He remarks that it is his ninth season of exploration in Alaska and the adjacent region. The party left San Francisco in May, some going to Sitka direct, whilst he and Mr. Marcus Baker took successive steamers for the same port, with a view to 'Coast Pilot' notes on the route viâ the inland waters of British Columbia and Alaska. Numerous magnetic observations for the determination of declination were taken, and material gathered for new or corrected local charts, and observations for currents, meteorology, and general hydrography. They were accompanied by Dr. Bean, of the United States Fish Commission, who took charge of the zoological collections, as in previous seasons. Being finally reunited at Sitka, the party proceeded along the coast, touching at various suitable points to Cook's Inlet, thence westward as far as Captain's Bay,

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* See vol. ii. p. 369.

Unalashka, thence northward through Behring Strait along the American Arctic coast as far as the ice would permit, finally reaching a point near the Seahorse Islands, not very far west from Point Barrow, where the pack closing in on the shore checked their progress, and, work in other directions being imperative, they returned to the vicinity of Behring Strait and then southward to Unalashka, experiencing several fearful gales on the way. From Unalashka they sailed for San Francisco. During the season, forty-two stations have been occupied for astronomical purposes and magnetics, of which the more important are as follows: The Presidio, San Francisco; Portland, Oregon; Victoria; Kasa-an Bay; Fort Wrangell; Sitka; Port Althorp; Port Mulgrave; Cook's Inlet (three stations); Kadiak Island, Shumagins (three stations); Belkoffsky; Unalashka; Chernoffsky; St. Paul Island; St. Matthew Island; Plover Bay, Siberia; Port Clarence; the Diomede Islands, in Behring Strait; Kotzebue Sound; Cape Lisburne; Icy Cape; and Point Belcher. This work has necessitated a cruise of over 1200 miles and six months' time. The decrease in the easterly variation of the needle, which Mr. Dall had previously shown to be taking place, is everywhere confirmed. In the higher latitude the difference between the present variation and that on the Admiralty charts is even as much as six or seven degrees in some places. The stations established by the Survey party are pretty evenly distributed, and the resulting chart is expected, therefore, to be tolerably complete. The determinations of position are dependent upon seven chronometers, rated at four well-determined points during the season. In addition to this work, a hydrothermal section of Behring Strait was made, confirming Mr. Dall's suspicions published last spring in the Appendix to the 'Coast Pilot,' and also the views of Lieutenant Onatsevich, communicated by him from observations made further south, when on the corvette *Vsadnik*, to the effect that the supposed southerly Polar current through these straits does not exist, and that the currents that do exist are dependent chiefly on the tides. A new and interesting fact has been elicited, namely, that the warm water (maximum 48° F.) which passes north through the straits is chiefly derived from the shallow sounds and large rivers of the adjacent American coasts, moved by the tide and warmed by the hot Arctic sun, and is warmer than any water found south of St. Lawrence Island "in the open" of Behring Sea. The observations on the Diomede Islands show that the boundary line between Russian and American territory passes between them, as stated in the treaty, which had been (from some erroneous charts) put in doubt. An immense "dead" glacier was observed on the north-west shore of Yakutat Bay, near the foot of Mount St. Elias. The feeders of this great ice-field, which covers perhaps 75 square miles, are so shrunken by the now milder climate, that the mass now lies as a great plain or table-land, without motion, and covered with detritus which preserves it from the heat of the sun. A careful examination was also made of another most remarkable ice phenomenon in Kotzebue Sound, visited by Kotzebue, Beechey, and the officers of the *Herald*, whose wooden record, standing since 1826, was found in good preservation on Chamisso Island. This consists of a mountain of pure ice, covered with a non-conducting layer of moss, vegetable matter, and clay of the period when the wild horse, buffalo, and mammoth frequented this region. Their bones are abundant, and have been figured by Seeman in the zoology of the *Herald*. The ice attains an elevation much beyond any hills or rock formation visible from its summit, and is interstratified like a rock with the clays, &c. It is pure except on the surface, has no glacial debris about it, and is devoid of motion. The cliffs rise at the sea front to perhaps 100 feet, and the hill of ice of which these cliffs form the face, attains 600 or 800 feet a few miles inland, entirely overlooking all the rock formations of the vicinity. Mr. Dall considers it impracticable to refer it to glacial action properly so called. It extends north to Point Barrow, and east to Return Reef on the northern coast, but is not continuous, and is absent in the rocky elevated parts, as, for instance, about Cape Lisburne. The zoological collections made during the past season include several birds and many fishes new to the region, as well as a smaller number probably new to science. Ethnological material was largely obtained, and it was remarked that the proper name of the people on the Asiatic side, described by Nordenskiöld and his companions, and previously by Hooper and Mr. Dall, is Yū′-it, a corruption or shortening of In-ñū-it (Eskimo), of which they merely form one tribe. They are totally distinct in language, race, and manners from the so-called Reindeer Tchukches (Tsau′-yū-at), who are a mere tribe of the Korak nation. Mr. Dall maintains that these Asiatic Eskimo are comparatively modern immigrants from America. This change of population is constantly going on; only last summer a new colony from Behring Strait settled at Cape Olutorsk, and more will go this year to join them. Internal hostilities and the want of food are the causes. Two winters ago several hundreds of American Eskimo perished from starvation on St. Lawrence Island. The destruction of the walrus by the whale ships, during a scarcity of whales, has had much to do with it; and the trading of liquor from the Sandwich Islands, keeping the people drunk when they should be laying up a winter store, is another. The season has not been an open one, no vessel got nearer than 10 miles to Herald Island, and only two reached Point Barrow, of which one stayed two hours and the other barely escaped wreck. But for twenty years the whales have not been so plentiful nor the whalers so successful; all filled up and were out of the Arctic Sea by October. Mr. Dall, in conclusion, says that nothing was (or was likely to be) heard of the two whale ships beset in the pack last autumn; nor of the *Jeannette*, for whose safety, however, he has little anxiety.

Danish Exploration in Greenland.—The scientific expedition sent to Greenland last year * under Lieutenant Hammer, of the Danish Navy, afterwards joined by Dr. Steenstrup, who went out in 1878, returned to Copenhagen on November 6th. During the winter of 1879–80 they were occupied with observations on the inland ice in the Umenak and Jacobshavn fiords, and they endeavoured to investigate the formation of the ice-masses in this region. In the course of last summer they took measurements of hitherto unknown fiords, and laid down on the map the western side of Disco Island.—The other expedition, under Lieutenant Holm, which went out to Greenland last spring, returned to Copenhagen a day or two later. Their investigations were chiefly directed to the Julianshaab district, and they were also employed in collecting information as to the population, &c., of the east coast of Greenland. The results of the observations made by these two parties will be valuable to those entrusted with the arrangements for the important expedition which it is intended to send next year to the coast of Greenland.

The Climate of Florida.—At the conclusion of his last report on the trade of Pensacola and some of the internal resources of Florida, Mr. Consul Cridland refers to the climate of the State, which is becoming well known to persons suffering from pulmonary affections. Large numbers of people from the more northern States resort to it to escape the severity of the winter there, and all speak highly of the charming climate, the beautiful scenery of the rivers and lakes, and the unlimited supply of delicious fruit. Even in summer, Mr. Cridland says, the climate is not hot, but mild and not subject to great changes of temperature. The thermometer seldom falls to 30° F. in winter, or rises to 90° F. in summer, in which latter season the average temperature is 82°, the constant sea-breeze modifying even that degree of heat. The Gulf breeze comes with the setting sun and cools the air at night.

The Island of Anguilla.—The last volume of official papers relating to Her Majesty's Colonial Possessions, furnishes some brief particulars respecting this little-known and small dependency of the British Crown. It belongs to the group of the Leeward Islands, and lies 60 miles to the N.N.W. of St. Christopher; it is 90 miles distant from Antigua, 21 from St. Bartholomew, 7 from St. Martin, and 120 from St. Thomas. The island is about 21 miles long, with an average breadth of 2½ miles, and contains about 30,000 acres, of which not more than 800 are cultivated. It is almost surrounded by coral reefs, through which there is a passage for large ships at the south-west of the island. Some parts of the island slope gently down to the sea, while at other points it rises abruptly from the shore to a height of 40 or 50 feet; the centre of the island, for the most part, assumes a basin-like form. The climate is very healthy, the inhabitants showing a fine physical development, and many living to extreme old age. Salt is the most valuable production of Anguilla, but the heavy rainfall has lately prevented the formation of the crystals by solar evaporation, and in 1879 the Salina was comparatively unproductive. Experiments have proved that phosphates, guano, and an inferior coal exist in Anguilla; the cultivation of indigo and cotton was at one time carried on, but has been abandoned; aloes and tobacco grow luxuriantly, but are not cultivated to profit.

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* See vol. i. pp. 331, 520.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Second Meeting, 22*nd November*, 1880.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*Major J. Alleyne*, R.A.; *John Raynor Arthur, Esq.; Henry Spencer Ashbee, Esq.; Charles Perry Austin, Esq.; Captain Edwin Ball*, R.N.R.; *Lieut.-General Sir Michael A. S. Biddulph*, K.C.B.; *Rev. Neville Arthur B. Borton; Sir Thomas Graham Briggs, Bart.; Septimus Brocklehurst, Esq.; Henry J. Buckwell, Esq.; Rev. John Lowry Carrick*, M.A.; *Oswald J. Cattley, Esq.; J. Parker Deane, Esq.*, Q.C.; *Robert William Dillon, Esq.; Hon. Wilbraham Egerton*, M.P.; *William H. Heaton, Esq.; John H. Heaton, Esq.; William Haworth, Esq.; Harry Joseph Hopkins, Esq.; William Jackson, Esq.; Henry Keene, Esq.; Rev. Joseph Christopher Lambert; William Libbey, jun., Esq.; W. Emerson MacIvor, Esq.; Adolph Marno, Esq.; James Meldrum, Esq.; George Mercer, Esq.; Major Colin C. Scott Moncrieff*, C.S.I., R.E.; *Colonel John Morland; C. Rushbrooke Nunn, Esq.; Charles Pfoundes, Esq.; Fred. S. Pulling, Esq.; William Henry Richardson, Esq.; John Russell, Esq.; John Shearman, Esq.; S. Percy Smith, Esq.; Lieut. Frederick Thomas Nelson Spratt*, R.E.; *William Edward Springall, Esq.; James Stewart, Esq.*, C.E.; *Henry George Thornton, Esq.; Thomas Walker, Esq.*, J.P.; *Lieut. Henry Lake Wells*, R.E.

The paper of the evening was—

"Temperate South Africa." By The Right Hon. Sir Bartle Frere, Bart.

The paper and the discussion which followed its reading are given *ante*, p. 1 *et seq.*

Third Meeting, 13*th December*, 1880.—General Sir H. C. RAWLINSON, K.C.B., Vice-President, in the Chair.

PRESENTATION.—*Adolph Marno, Esq.*

ELECTIONS.—*Giovanni Emilio Cerruti, Esq.; Frank Henry Cook, Esq.; John M. Cook, Esq.; Harry M. Hayward, Esq.; Edward Dowling Hodgson, Esq.; Henry J. Humphery, Esq.; Hubert Edward Henry Jerningham, Esq.; Colonel Sir William Owen Lanyon*, K.C.M.G., C.B.; *Hugh Leonard, Esq.; H. E. Perkins, Esq.; Rev. Charles E. B. Reed*, M.A.; *Alfred Oswald White, Esq.; Brigadier-General Sir H. Evelyn Wood*, V.C., K.C.B.

The following paper was read:—

"Geographical Results of the Afghan Campaign." By Captain T. H. Holdich, R.E., lately in charge of surveys, Afghanistan.

Will be published in the February number of the 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—November 19th, 1880: M. A. Grandidier in the Chair.—At the request of the Chairman, Dr. Hamy, of the Muséum d'Histoire Naturelle, made some observations respecting the work on the ruins of Boro-Boudoor, published by the Dutch Government, and presented by the Geographical Society of Amsterdam, and a hope was expressed that the French Government might undertake the publication of a similar work on the ruins of ancient Cambodia.—M. Weyprecht forwarded to the Society the protocol of the International Polar Congress, held at Hamburg* in October 1879, together with a statement of the resolutions of the second Congress held at Berne in August 1880, and he deeply regretted that the co-operation of France in this international enterprise in the Polar regions could not be counted upon. He insisted, however, on the necessity for instituting at different points numerous simultaneous observations, by which alone it would be possible to study the general laws which govern periodical phenomena, such as meteorological and magnetic phenomena, Polar auroras, &c. M. Weyprecht further suggested that Antarctic rather than Arctic investigations were the province of France, seeing that she was the first to institute systematic observations with regard to terrestrial magnetism and Polar auroras (in *la Recherche* expedition of 1838), and he pointed out that it would be very easy and cost comparatively little to establish a station for observation on Kerguelen Island, or on one of the islands further south, for a year.—The Minister for Foreign Affairs communicated M. Wiener's report on his journey across Equatorial America, to which reference was made at the meeting of November 5th.—The General Secretary read some extracts from a letter of Colonel Flatters, now engaged on a mission to the Sahara, in which he announced that a Tuareg deputation had come to meet him at Algiers, and expressed the opinion that the results achieved by his first expedition being thus confirmed, the country was opened for the passage of the mission, provided no new difficulties arose. Colonel Flatters had received very favourable letters from the chiefs of the Hoggar and Ozghar tribes, and he was convinced that as far as the tropic at least there would be no danger to surmount, but beyond that, among the Tuaregs of the south, all would depend upon circumstances.—The Chairman having presented to the Meeting M. C. A. Verminck and MM. Josué Zweifel and Marius Moustier, M. Henri Duveyrier spoke as follows on the question of the sources of the Joliba or Niger, discovered by the two latter-named gentlemen: "The determination of the true source of a great river which rises in a little-known region, is not an easy matter, and this is the case with the sources of the Joliba, Kworra, or Niger, with the basin of which we are far from being acquainted in a satisfactory manner. The case is, indeed, a special one. The basin of the Joliba is divided into two parts, which are subject to meteorological conditions of an opposite nature. On the north, about a third of this basin lies within the Sahara, and at the present time does not contribute in any way, as far as is known, to the main stream. The valleys which come down from the Ahaggar and Tassili plateaux, in the country of the Tuaregs of the north, to the north-east bank of the Joliba in the Haussa country, are now absolutely dry in their middle part. We can, therefore, leave out of the question this fossil portion of the Joliba basin, and consider only the living portion, viz. that which is comprised between Adamâwa on the east and the Kuranko and Kong Mountains on the west. From this side we have the Joliba or Kworra, and from the other the Binue, which meet near Lukoja and flow down to the Atlantic. Of these two streams the Joliba is incontestably the longer, and it is consequently possible to know the source of the river without knowing that of the Binue. Such being the problem, let us consider how the solution of it now stands. Up to the recent publication by MM. Zweifel and Moustier of the results of their journey of exploration to the source of the Joliba, it was admitted that this source was situated in 9° 25′ N. lat., 9° 45′ W. long., on a mountain named Loma, and this knowledge was due to Major A. G. Laing. Whilst he was in Sulimania in 1822, he took two compass bearings of Mount Loma from the upper part of Mount Konkodugoré, south of the town of Falaba and of the source of the river Séli or Rokelle. The apex of this very acute triangle was on a sharp-pointed peak, very nearly 91½ miles distant from Falaba; consequently, the details of his observation being known, the position assigned to Mount Loma by Major Laing could only be looked upon as provisional, because it is vague and uncertain. We must also remember that this mountain, which they called Loma, was pointed out to Major Laing as being the source of the great river of their country by the natives in reply to pressing questions on his part. . . . But is the river which rises in this pretended Mount Loma, really the first and most distant rivulet which, swollen by successive affluents, becomes the Joliba? Another rivulet to the south-west or the south-east, a small stream unknown to the people of Sulimania, might one day take its place as furnishing a longer course. This doubt, to which no one had given expression, but which had occurred to the minds of several geographers, is at length cleared up for the first time. 78½ miles to the south-west of Major Laing's Mount Loma, and only 193 miles from Free Town, in the British colony of Sierra Leone, MM. Zweifel and Moustier saw the Tembi-Kundu, or mountain head of the (river) Tembi. This river, which is longer than the Faliko, takes the name of the Joliba after their junction. According to MM. Zweifel and Moustier, it rises in 8° 36′ N. lat., 10° 30′ W. long., in one of the summits of a mountain chain which bears the name of Loma, like that we have just spoken of. It is possible that the mountain chain of Loma is continued to the north-east with some interruptions as far as Major Laing's Mount Loma; and it is equally possible, as often happens in other parts of the world, that the name of the chain is a substantive signifying 'mountain,' 'summit,' or 'chain of mountains,' and that in this case it is applied *par excellence* to the chief orographical feature of a whole region. We must heartily congratulate MM. Zweifel and Moustier on their principal discovery, viz. the Tembi-Kundu, or the furthest known source of the Joliba. We do not hesitate to say that this discovery is a considerable fact in the history of geographical progress during the year, and, perhaps, it will always retain its importance. This we shall learn after the complete exploration of the countries of Môsi, Kong, Burré, and Kissi, in fact, of all the southern portion of the vast triangle, of which the course of the Joliba forms the two longest sides, between its source and its mouth, and into which Réné Caillié, Heinrich Barth, and Benjamin Anderson alone have penetrated to a small extent. Here flow the Bakhoy, the Sarano, &c., all tributaries of the Joliba, and which all appear to rise on a plateau, where, applying to a chain the name of a great market, our maps give a mountain chain called Kong. We must add that the existence of a long and continuous chain of mountains, given in all ancient maps and in many modern ones, has still to be proved; it is known where the chain begins on the west and that it stretches as far as 7° 40′ W. long., but from that point to where M. Bonnat saw mountains to the north of Salaga, the continuity of the range is a matter of mere supposition. In spite of the insufficiency of our information regarding the interior of the region under consideration, the deductions which can be made from Caillié's journal between Timbo and Timbuktu, Barth's between Sai and Timbuktu, and the examination of the native statements collected by the latter traveller, almost completely destroy the hypothesis of a great affluent south of the Joliba, which could rival the Tembi in length. It is probable, therefore, that nothing in the future will detract from the glory of MM. Zweifel and Moustier, who are the discoverers of the source which is furthest to the south-west, and according to all appearances, of the true source of the Joliba or Niger." M. Duveyrier having concluded his address, M. Zweifel explained to the Meeting under what circumstances he and M. Moustier had undertaken their explorations; and Dr. Harmand afterwards read some passages from their account of the journey, published *in extenso* in the last Bulletin of the Geographical Society of Marseilles.

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* Cf. vol. i. p. 738.

——— December 3rd, 1880: Dr. Hamy, of the Muséum d'Histoire Naturelle, in the Chair.—The General Secretary read a despatch addressed to the Society by Dr. Oscar Lenz on his arrival at Medina, on the Senegal, from Timbuktu.—M. Daubrée, of the Institute, gave some information respecting volcanic phenomena in the Island of Dominica, and communicated the analysis of sundry specimens sent by M. L. Bert.—The Chairman announced to the Meeting the mournful intelligence of the decease of M. Sabin Berthelot, who died at St. Croix de Teneriffe at the age of eighty-six, after a laborious life entirely devoted to the study of the Canary Islands and their inhabitants in ancient and modern times. M. Berthelot had been for five years General Secretary of the Geographical Society.—Colonel Laussedat communicated to the Society two series of experiments which he made in 1868 and 1874 with aneroid barometers made for the use of travellers.—M. d'Arnaud-Bey communicated a paper on his expedition to the White Nile in 1839–42, to accompany his large map in ten sheets.—Captain de Lannoy, of the Engineers, presented to the Society a manuscript map, on a large scale, of Southern Africa from the regions discovered by Captain Speke on the east, and by M. Savorgnan de Brazza on the west, to the Cape of Good Hope. The object of the map is to admit of a precise comparison of the information brought by successive explorers, with the view of showing the value of their work, and of thus filling in correctly the map of Africa.

——— Annual General Meeting, December 17th, 1880.—The Chair was taken by M. Alph. Milne-Edwards, in the absence of Admiral Baron de la Roncière le Noury, who was prevented by indisposition from delivering his usual Address. Taking advantage of the absence of the President, the Chairman acknowledged how much the Society owed to him for his services. He gave a sketch of the labours of the Society since the war, pointing out besides what still remained to be done, and called attention to the extension of the scope of geographical studies, and the greater precision now required of travellers. It is no longer sufficient to fix the course of a river, or to determine only the position of a town or a mountain; zoology, botany, geology, and the study of the depths of the sea now form an essential portion of geographical work, and—the speaker added—we find that the further we advance, the more there remains to be discovered.—M. Grandidier read the names of the new members admitted since the last general meeting, and remarked on the prosperous condition of the Society, which now numbers 2096 members.—At this period M. Ferdinand de Lesseps entered in company with two members of the Government of the United States of Colombia, and was very warmly received. He informed the meeting that the subscription list of the company formed for the construction of the canal through the Isthmus of Panama had closed that day with 120,000 names.—The General Secretary, M. Ch. Maunoir, read his annual report on the progress of geography, which will be published *in extenso* in the Bulletin of the Society.—M. C. Rabat afterwards read a paper on his journey in the north of Norway.

Geographical Society of Marseilles.—November 6th, 1880: M. Alfred Rabaud, President, in the Chair.—The meeting was held for the presentation of medals to M. C. A. Verminck and MM. Josué Zweifel and Marius Moustier, the promoter and leaders of the recent expedition to the sources of the Niger, and among others present were M. Aimé Ollivier, who has lately made a journey to the Futa Jallon highlands in West Africa, and Dr. Bayol, a member of Captain Galliéni's expedition.*—M. Rabaud delivered an address in which he referred to the various explorations of the Niger from the time of Mungo Park, and then spoke in eulogistic terms of the successful labours of MM. Zweifel and Moustier. M. Zweifel afterwards read an account of the origin, progress, and successful completion of the expedition, the full text of which is given in the last Bulletin of the Society. At the conclusion of the paper, the President, amidst loud applause, handed the medals and diplomas to MM. Verminck, Zweifel, and Moustier, as the highest honours which it was in the power of the Society to bestow upon them.

Geographical Society of Lyons.—November 6th, 1880. — M. Coillard, a French Protestant missionary, read a paper on South Africa, in which he stated that he had lived for twenty years in Basuto-land, a fertile region, rich in pasturage and flocks, where an English mission had been established for fifty years, and had made great progress in civilising the inhabitants. In 1877 he was charged with the direction of a native missionary expedition, the object of which was to extend the Basuto Church to the north of the Transvaal and the Limpopo as far as the Zambesi. He was accompanied by Mme. Coillard and their daughter, four native missionaries, with their wives and families, and several Christians, the party consisting of twenty-four persons in all. M. Coillard gave the meeting an account of this journey, which lasted altogether two years and a half, and of various incidents connected with it, including the retention of the party for three months by the king of Matabele-land. He also described the regions he had traversed, and the manners and customs of the tribes he had visited. Several of them, he said, well deserved the name of savages, for they were in a state of abject degradation. Sometimes, however, vestiges of Christian traditions were found among them; and M. Coillard alluded to the discovery, in the auriferous mines of the region, of the remains of galleries, which proved that they had been worked in former times. M. Coillard, with his party, at length arrived at the Zambesi, where he visited the Victoria Falls, and in that region an event happened which has made his name well-known. One day, in ascending the river, he met in the hut of a hunter a European, in a state of destitution and exhausted by fever and fatigue, who proved to be the Portuguese traveller, Major Serpa Pinto.† In reference to some criticisms which had been passed on that officer on his return to Europe, M. Coillard availed himself of the opportunity now afforded him to bear testimony to his high character and the friendly relations between them. After labours extending over two years and a half, M. Coillard had the satisfaction of successfully accomplishing the object of his expedition.—In thanking M. Coillard for his address, the President announced that he had been elected a corresponding member of the Society.

Congress of the Geographical Societies of France.—Sir R. W. Rawson sends us the following report of the last meeting of this Congress which met at Nancy from the 5th to the 10th August last, and held two sittings daily, discussing important geographical problems, relating more particularly to the subject of teaching geography.—M. Gauthiot read a paper of M. de Luze's on "Geographical Terminology." In this was shown the inconvenience of translating into the language of the author's country many names of foreign localities, thus causing not only confusion, but also gross errors. Another grave inconvenience was that of writing, e. g. Mots Gebel Aurés, fleuve Moura-Tchai, repeating thus twice the words "mountain" and "river." To avoid this, M. de Luze proposes, 1st, to suppress in all atlases foreign geographical terminology; 2nd, to maintain, on the other hand, but in parentheses, those terms which are accompanied by qualification of any kind, placing the translation first, as "Yellow River" (Hoang-ho); 3rd, to preserve in their exact form all the native names of places in their own national orthography, e. g. "Köln," and not "Cologne," "Mainz," and not "Mayence," &c.; 4th, to adopt the national orthography for all those geographical terms of countries which do not use the Latin alphabet, writing them in the manner which will best render the true pronunciation as exactly as possible. The paper was accompanied by a glossary of all geographical terms.—M. Barbier announced that he had collected in a Geographical Pantheon of Lorraine the names of the principal travellers of that country.—An historical account of the project of the Interoceanic Canal of Panama was read by M. Bionne, and this and other questions were discussed. The following votes were then proposed and passed:—The Congress hopes to see encouraged the publication of maps in relief, at moderate prices; and renews the expression of a wish that the authors of geographical maps should indicate the meridian which they have adopted, and what is the difference between it and the principal meridians hitherto used; it desires that an International Congress should be convoked to determine the question of a single initial meridian, composed of delegates of the several geographical and scientific societies; finally, it expresses a desire that the geographical societies should take up the question of Commercial Geography, either by constituting special commissions, or otherwise.—On the subject of Instruction in Geography, the Congress came to the following four resolutions:—1st. That geography should occupy an important place in instruction, by the side of other branches of study; that instruction in geography and history should be assigned to special professors; that a pass should be established for geography and history; that as occasion offers, professors of geography should be named in all the university schools. The Congress, further, is of opinion that geology should be the base of geographical studies. Contemporaneously with the Congress, an Exhibition was opened, organised by M. Barbier, assisted by M. Millot. The Horticultural Society of Nancy contributed to the success of this interesting exhibition, placing among the maps, books, and collections a number of exotic plants. These plants were not arranged according to their botanical order, but geographically, according to their native country. Thus they formed a vivid illustration of Geographical Botany. Every plant, having its own number, was described in a special catalogue, in which were stated the original habitat of the plant, the name of the traveller who introduced it into Europe, the name of the horticulturist exhibiting it, and the attempts made in France, and especially in the eastern departments, to acclimatise it. Among the collections were noticed that gathered by Dr. Crevaux in the basin of the Amazons; that of M. Cournault, containing the industrial products of Algiers, of Senegal, of the Gaboon, and of Morocco; the collection of Revoil from the country of the Somâli, &c. Lastly, under the title of Retrospective Geography, were exhibited numerous ancient maps, some of which were of considerable value. According to the report of M. L. Delavaud, from which we have taken the above particulars, the part of the Exhibition which was devoted to primary and secondary instruction deserved the most attention. Many maps, some of which were in relief, exhibited by the lyceums and educational institutions, were truly worthy of attention, and showed what progress France has made in geographical instruction within the last ten years. The next Congress is to meet in 1881 at Lyons.

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* See vol. ii. pp. 185, 562.

† See Proceedings R. G. S., vol. i. p. 487.

Geographical Society of Dresden.—October 15th, 1880.—At this and the previous meeting Dr. RUGE, the President, read a report on the cartography of Saxony and on the survey of the country in the sixteenth century. Relying on the researches made in the kingdom of Saxony, he stated that the oldest map was that of the district of Schwarzenberg, drawn by Georg Oder in 1551, on the scale of 1 : 26,000. The survey and the preparation of the map of the country remained in the hands of the Oder family from 1550 to 1600. The then Elector, however, endeavoured to prevent this map being published and getting into the hands of unauthorised persons, and it was only after long negotiations that authority was obtained for its issue. It was engraved in 1568, and is the oldest specimen of map-engraving extant. Ortelius reproduced it in his Atlas, and for two centuries it formed the basis of all cartographical work in Saxony.

Geographical Society of Halle.—November 10th, 1880.—Dr. KIRCHHOFF, the President, made a report to the Meeting on Lepsius' new theory of the mixture of the African races, as set forth by that well-known Egyptologist in his recently published grammar of the Nubian language. [The following is the title of the work referred to: 'Nubische Grammatik mit einer Einleitung über die Völker und Sprachen Afrikas.' Berlin, 1880. (*Asher & Co.* Price 1*l.* 6*s.*)]

Imperial Geographical Society of St. Petersburg.—November 20th, 1880: M. SEMENOF in the Chair.—M. Sreznefsky, the Secretary, informed the Meeting that the Society had received an official invitation to take part in the Geographical Congress to be held at Venice in September 1881, and gave an outline of the programme of its proceedings and other details respecting it. The Council of the Society had cordially accepted the invitation, and had appointed the following to act as a committee in connection with it: Baron Fr. v. Osten Sacken, chairman, MM. Sreznefsky, Grigorief, Kofersky, Meller, Mushketof, Rykalof, Staritzky, Schmidt, Schrenk, Stubendorf, Matveief, Minaief, Harkayi, and Stein.—M. Piassetsky afterwards delivered an address on the subject of China and its inhabitants, dealing more particularly with the latter. In referring to various traits in their character, M. Piassetsky dwelt particularly on their singular indifference, mentioning several instances in illustration. He observed that he was in the interior of China at the time of the decease of the Emperor Tung Chih, who died without an heir at the age of eighteen; he expected that in consequence great agitation would have prevailed throughout the country, but there was nothing in the daily life of the Chinese to mark the loss of the Son of Heaven. M. Piassetsky afterwards made some remarks on popular education, culture, &c., among the Chinese.

Geographical Society of Cairo.—November 19th, 1880: General STONE-PACHA, President, in the Chair.—The President read a paper by the Rev. C. T. Wilson, recently elected an Honorary Member of the Society, on Lake Victoria and the country of Uganda, and in reference to his remarks on the connection between the height of the water in the lake and the annual rise of the Nile, General Stone stated that the officers employed in that region had been directed to make meteorological observations and a careful comparative study of the movement of the lake-waters and of those of the Nile.—His Excellency Riaz-Pacha afterwards delivered a feeling address on the principal phases in the career of Dor-Bey, late Inspector-General of Schools, and on his services to the cause of public instruction in Egypt.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Capper, Samuel James.—The Shores and Cities of the Boden See. Rambles in 1879 and 1880. London (De la Rue & Co.): 1881 [1880], 8vo., maps.

A general description of the Lake of Constance, with details of its climatic phenomena and fauna, and special account of the historical incidents affecting the country, cities, and towns in its neighbourhood. The Rheinthal and valley of the Prättigau are also treated in like manner, as far south as Davos and Chur. A sketch-map is given of these two valleys, and a detailed map of Lake Constance and the surrounding region (scale 4½ miles to the inch); the work being also well illustrated by 22 original etchings on stone by H. Schmidt-Pecht.

Havard, Henry.—La Hollande à vol d'oiseau. Paris (Decaux & Quantin): 1881 [1880], large 8vo., pp. 398, map, illustrations. (*Dulau*: price 18*s.* 9*d.*)

The numerous and well-executed full-page and smaller engravings (by Lalanne) give a remarkably clear idea of the nature of the country, as well as of its architectural characteristics, to which the chief attention is directed.

Lasaulx, Arnold von.—Der Aetna. Nach den Manuscripten des verstorbenen Dr. Wolfgang Sartorius, Freiherrn von Waltershausen, herausgegeben, selbständig bearbeitet und vollendet. Zweiter Band. Topographisch-geognostische Beschreibung, Entwicklungsgeschichte und Producte des Aetna. Leipzig (Engelmann): 1880, 4to., pp. 548, cold. frontisp., map, pls., and woodcuts. (*Dulau*: price of complete work, 4*l.* 7*s.* 9*d.*)

This second and concluding volume discusses the topography of the mountain and its neighbourhood in detail, illustrated by admirably clear views of the chief points of interest. The history of its volcanic development is also given, with an account of the composition of its various rocks and mineral products.

The map (scale 1 : 15,000) shows the Valle del Bove, with the limits of the different lava streams, the craters, and other local phenomena, marked with the dates of their occurrence or development.

Playfair, Lieut.-Col. R. L.—Handbook to the Mediterranean: its Cities, Coasts, and Islands. For the use of General Travellers and Yachtsmen. London (Murray): 1881 [1880], post 8vo., pp. xliv. and 512, maps, plans. Price 20*s.*

This useful addition to Murray's well-known series, by an author whose former contribution is universally acknowledged to be one of its chief successes, is divided into two parts: the first comprising Africa (Morocco, Algiers, Tunis, and Tripoli), Egypt, Syria, Asia Minor, and Turkey in Europe, the Greek Archipelago, Cyprus and Malta, Greece and Albania; the second, Austria and Dalmatia, the Italian Coast, Sardinia, the Lipari Islands, Sicily, Corsica and the Southern Coast of France, and Spain and Gibraltar, including the Balearic Isles. Apart from the information as to outfit, ports, anchorages, &c., specially intended for yachting travellers, the aim has been to avoid localities already described in former Handbooks, and to devote space to such as have been neglected or insufficiently treated hitherto. Much of the usual detail of guide-books is dispensed with, so that the book assumes a higher standard than most of its fellows. The portion relating to the Balearic isles (and especially Menorca), recently visited by Colonel Playfair, is of particular interest, owing to his descriptions and figures of megalithic monuments or "Talayots" near Mahon and Ciudadela. The maps and plans are too numerous (sixty-four) to specify; they cover the chief objects of interest.

ASIA.

Cust, R. N.—Linguistic and Oriental Essays, written from the year 1846 to 1878. London (Trübner): 1880, 8vo., pp. 484, map. Price 18*s.*

The portions of this collection referring to the countries betwixt the rivers Satlaj and Jamna in North India, Sikhland, Palestine, and Mesopotamia, warrant mention here of this work, which is mainly ethnological, linguistical, and historical. The map shows the route of Rama, hero of the great Indian historic poem, in ancient and modern India.

Fugaku Hiyaku-Kei; or a Hundred Views of Fuji (Fusiyama), by Hokusai. Introductory and Explanatory Prefaces, with Translations from the Japanese, and Descriptions of the plates, by Fredk. V. Dickins. London (Batsford): 1880, 3 parts of original Japanese plates and text; 1 part English translation, &c., pp. xxviii. and 70, pls.

Mr. Dickins gives a list of the 102 plates in the original volumes, with a preface on Japanese art, &c., a view of the mountain from Yoshida, a description of it from the great Pictorial Encyclopædia of 1714, translations of the prefaces to the three original volumes, and descriptions of the plates, which are illustrative of the mythological history and physical aspects of Fusiyama, from the pencil of the artist known as Hachiyemon (?) Miuraya. Some recent notes on the botany of the mountain are given in the appendix.

Guimet, Émile.—Promenades Japonaises. Tokio–Nikko. Paris (Charpentier): 1880, 4to., pp. 288, illustrations. (*Williams & Norgate.*)

Although not numbered as forming part of a series, this volume practically follows the author's work bearing the same first title, published in 1878 (price of the two vols., 2*l.*). M. Guimet was accompanied by a French artist, M. Félix Regamey, whose drawings are apparently the more valuable results of the expedition, which seems to have been confined to the neighbourhood of Yokohama and Tokio. Some of the illustrations are coloured, and represent various aspects of the country as well as the people.

Kreitner, Gustav.—Im fernen Osten. Reisen des Grafen Bela Széchenyi in Indien, Japan, China, Tibet und Birma, in den Jahren 1877–1880. 1 Lieferung. Wien (Hölder): 1880, 8vo., pp. 32, illustrations. (*Williams & Norgate:* price 6*d.*)

Lieutenant Kreitner accompanied Count Széchenyi in his Tibetan journey, and here commences the publication of the narrative, which is to be completed in some 30 parts, issued at intervals of ten days, and illustrated by 200 original wood engravings and several maps. The first number includes the journey to India.

Marvin, Charles.—Colonel Grodekoff's ride from Samarcand to Herat, through Balkh and the Usbek States of Afghan Turkestan; with his own map of the march-route from the Oxus to Herat. London (Allen): 1880, post 8vo., pp. 224, portr., map. Price 8*s.*

Mr. Marvin has simply translated Colonel N. Grodekoff's narrative, which commences in September 1878. That officer left Samarcand, undisguised, and with three followers, reaching the Turcoman settlement of Patta Keesar on the Amu Daria on 17th October. Thence he was escorted by Afghans to Mazar-e-Shereef, and after an imprisonment there, arrived at the Usbek town of Saripool on 3rd November, viâ Sheebeerkhan. A ride of two days in very mountainous country, by Koortchee and the defile of Beltcherag, brought the traveller to the city of Maimene, then within reach of Turkoman forays, and from which, after a short stay, he started by the valley of the Kaisar river to Charshambe, with a cavalry escort. In this part of his narrative, Grodekoff discusses the oasis of Merv and gives some details of the Tekke Turkomans, stating that the locality marked Merv on our maps is nothing but two houses, a school, and some cattle-enclosures (probably clay-walled forts, according to the translator): Merv, in his opinion, is not the key of Herat. His escort would not allow him to take the easiest road, for fear of the Turkomans, and he was conducted over the mountains by Osobi Kof and the Kara Djangel, across the Moorgab to Kalai-Naoo, from whence he reached Herat on 16th November, through Kooshk and the Khazret-i-Baba pass, finally arriving at the Persian frontier on November 22. Colonel Grodekoff, assuming that his road from the Moorgab is the route from Merv, emphasises his opinion that it would be an impossibility to conduct an expeditionary force of any strength along it. He gives an alternative route from Merv to Serakhs on the Heri Rood, 144 miles, with three waterless stages, each 45 miles long.

The route from Samarcand to Mazar-e-Shereef, omitted by Colonel Grodekoff, is given in an appendix from the description in the *Golos*, 1879, by Dr. Yavorsky, together with an account of Abdurrahman Khan by Pashino, and a short notice of foreign military missions in Persia.

The author's plan of a village near Herat is reproduced, and the map shows his march-route from the Oxus to Herat (only by eye), scale 12·5 versts (about 8⅓ miles to the inch).

Oliphant, Laurence.—The Land of Gilead, with Excursions in the Lebanon. Edinburgh and London (Blackwood): 1880, 8vo., pp. 538, maps, photograph, illustrations. Price 21*s.*

The author's travels were undertaken with the object of establishing a Jewish colonisation of Palestine under the auspices of the Sultan of Turkey. His route was from Beirut to Sidon, then inland S.E. to Banias, along eastern Jaulan and across western Hauran to Irbid (with a visit to Capitolias) and Gadara. Continuing east of the Jordan, he struck south to Ajlun, Jerash, and Es-Salt (Ramoth Gilead), from which point an excursion eastward to Kul'at Zerka (Gadda) on the Haj road was made, returning by Rabbath Ammon. From Es-Salt, after visiting Arak-el-Emir in southern Gilead, the valley of the Shaib was followed to the Jordan, and Jerusalem reached by the Wady Kuneitirah. The return to Beirut was by Nablous, Haifa, and the coast. A second journey was made from Beirut southwards by Der-el-Kamir to Jedeideh and Damascus, with excursions to Baalbec and Malula and eastward to Jebel Kaus, the return being by Zahleh and the Lebanon. Some fresh identifications of Scriptural localties are made or suggested. A map (scale 14½ miles to the inch) shows Palestine as far east as 36° 38′ long., with the author's route; a smaller one gives the lines of proposed railways from Ismailia and Akabah to Haifa, and northwards along the Jordan Valley to Damascus, with the site of the proposed Jewish colony east of the Jordan, between the rivers Jabbok and Arnon.

Rein, J. J.—Japan, nach Reisen und Studien im Auftrage der königlich Preussischen Regierung dargestellt. Erster Band. Natur und Volk des Mikadoreiches. Leipzig (Engelmann): 1881 [1880], 8vo., pp. 630, photographs, plates, woodcuts, 2 maps. (*Dulau:* price 18*s.*)

The author, now Professor of Geography at the Marburg University, spent two years in the Japanese Islands (1874 and 1875) for the purpose of studying the national commercial aspects, as commissioned by the Prussian Minister of Trade; and he prefaces the volume which is to contain the special results of his inquiries by this physical description. The present volume contains, first, a general sketch of the political and provincial divisions of the empire, with vocabulary of chief geographical terms employed; followed by discussions of coast-line, seas and currents, chief geological features, Orography, Hydrography, and Meteorology, and of the Flora and Fauna (the two latter subjects in some detail). The second part is devoted to the people, and commences with a sketch of their history, civilisation, and social condition from 660 B.C. to the present time; followed by an account of their ethnography, and concluding with detailed topography.

The views, when not photographs, are evidently drawn from them, the illustrations being remarkably faithful. Plans of Kioto and Tokio are given, from Japanese sources. The maps are Orographico-hydrographical (scale 1:2,930,000), and Topographico-statistical (scale 1 : 7,500,000).

Schliemann, Heinrich.—Ilios. Stadt und Land der Trojaner. Forschungen und Entdeckungen in der Troas und besonders auf der Baustelle von Troja. Leipzig (Brockhaus): 1881 [1880], large 8vo., pp. 880, pls., maps, and plans. (*Dulau*: price 1*l*. 16*s*. 6*d*.)

Although essentially of archæological interest, this work contains accounts and illustrations of the present and historical geography of the Plain of Troy, with descriptions of its mountains, rivers, climatology, zoology, flora, and ethnography. The appendices contain various papers by other authors, one of them being a catalogue of plants by Ascherson, Von Heldreich, and Kurtz. The map (scale 80 ft. to the inch), by Burnouf, shows the Plain of Troy, with sites of excavations, &c.

Ujfalvy-Bourdon, Marie de.—De Paris à Samarkand. Le Ferghanah, le Kouldja, et la Sibérie Occidentale. Impressions de voyage d'une Parisienne. Paris (Hachette): 1880, large 4to., pp. 487, 273 engravings, 5 maps. (*Hachette*: price 2*l*. 10*s*.)

Mme. Ujfalvy (whose name is to be pronounced "Ouifalvi," as transliterated into French) left Paris for Russia and Central Asia in August 1876, with her husband, M. Ch. E. de Ujfalvy de Mezö-Kovesd, whose publications upon the scientific results of the expedition upon which he was sent by the French Minister of Public Instruction have been from time to time noticed in this Bibliography. Mme. Ujfalvy here supplies the incidents of travel, which formed no part of her husband's books. The route taken was from St. Petersburg to Orenburg by Moscow and Samara, thence by Orsk and Irghiz to Kazalinsk, and along the northern bank of the Syr Daria to Tashkend, with excursions to Samarcand, Chodshend, Kokand, and other towns of Ferghana. The journey was then extended eastward to Kuldja, and the return made northwards by Semipalatinsk to Omsk, Orenburg being again reached by Troitsk. The maps show these journeys, the ethnography of the Pamir, the Upper Oxus and Jaxartes, the Kuldja district, and the town of Samarcand. The illustrations are on geographical, ethnographical, and architectural subjects, and are mostly familiar.

Venukoff, M.—Liste des Voyageurs Russes en Asie depuis l'occupation par les Russes du bassin de l'Amour et du Sémirétchié, 1854–80. Post 8vo., pp. 24 [n.p., n.d.].

This list (presented by the author, and apparently not to be purchased, from its want of the usual indications of publication) is divided into two parts (in Russian and French), the first, presented to the Paris Geographical Congress in 1875, including the names of travellers and the region explored to that date; the second prepared for the Congress at Venice. No bibliographical references are given.

AFRICA.

Eden, C. H.—Africa seen through its Explorers. London (Society for Promotion of Christian Knowledge): 1880, post 8vo., pp. 322, map, illustrations. Price 5*s*.

A mixture of general physical and historical outlines, with extracts from the narratives of some well-known travellers.

Holub, Emil.—Sieben Jahre in Süd-Afrika. Erlebnisse, Forschungen und Jagden auf meinen Reisen von den Diamantenfeldern zum Zambesi (1872–1879). Wien (Hölder): 1881 [1880], 2 vols. 8vo., pp. 528 and 532, 255 woodcuts, 4 maps.

The completion of the work, of which the first part was mentioned in 'Proc. R.G.S.,' 1879, p. 270. Vol. I. contains the account of the author's journey to the Diamond Fields, with descriptions of Dutoitspan and Kimberley; also of his first and second journeys into the interior, the one to Likatlong on the west bank of the Harts river, and thence along the western bank of the Vaal river by Bloemhof to Potchefstroom and Wonderfontein, returning to Dutoitspan; the other to Shoshong by Musemanjana, Moshaneng (late Montsua's) and Molopolole (late

Sechele's), and back to the Diamond Fields over Linokana. The second volume is devoted to his more extended third journey to Shoshong viâ Jacobsdal and Zeerust, thence to the great salt lakes north of the Zooga or Botletle river and east of Ngami, through Khama's country to the confluence of the Chobe and Zambesi, with accounts of his various stays in the Marutse capital of Sesheke (Sepopo's), his visit to the Victoria Falls, and explorations of the Upper Zambesi, and of his return through the Makalala and West Matabele country. A full epitome of this last journey is given in our 'Proceedings' for 1879, pp. 166–180.

The ethnological, political, and economical aspects of the Koranas, Batlapins, Bakwenas, Bechuanas, Makalarahi, Barolongs, Masupias, Marutse-Mabunda, and other tribes of which the author had personal knowledge, are particularly discussed and illustrated; and considerable attention is given to the fauna of the regions traversed, partly owing to the necessity of hunting as a means of subsistence. The numerous illustrations, from the author's drawings, give a special value to the work, as representing scenes and incidents in parts of Central South Africa not before treated pictorially.

The maps require particular mention. No. 1 gives the whole of the region traversed by Dr. Holub (scale 1 : 7,200,000), from 20° to 31° E. long., and from Port Elizabeth in the south to 13° S. lat., showing the different territorial and tribal limits, mission stations, residences, &c.

No. 2 is a special route map (scale 1 : 500,000) of the central part of the Eastern Bamangwato (including the Saltpan district) and Western Matabele countries, showing the physical nature of the immediate neighbourhood and the distribution of animal life.

No. 3 represents the Zambesi above and at the Victoria Falls (scale 1 : 7000), with geological, ethnological, zoological, and botanical local references.

No. 4 (scale 1 : 180,000), like the two preceding, from compass bearings, shows the Zambesi from the Nambwe cataract to the Makumba islands, including the site of New Sesheke, and giving the author's boat journey, with indications of the conditions and inhabitants of the regions on both banks of the river, and various hydrographic particulars.

It is understood that the English translation of this interesting work, to be published by Sampson Low and Co., is now nearly completed.

Livingstone.—The personal life of David Livingstone, LL.D., D.C.L., chiefly from his unpublished Journals and Correspondence in the possession of his family. By William Garden Blaikie. London (J. Murray): 1880, 8vo., pp. 504, portrait, map. Price 15*s.*

The travels of Livingstone are not specially recorded in this volume, except for the purpose of connecting the narrative of his life, but some new light and colour is claimed to be thrown upon them from correspondence with friends and journals hitherto unpublished. The map shows the traveller's three great routes.

AMERICA.

Hayes, A. A., jun.—New Colorado and the Santa Fe Trail. London (Kegan Paul and Co.): 1881 [1880], large 8vo., pp. 200, map, illustrations. Price 9*s.*

The word "new" simply refers to the altered conditions of life in the country. Some of the illustrations are good, and give a good idea of physical conditions.

Markham, C. R.—Peruvian Bark. A popular account of the Introduction of Chinchona Cultivation into British India, 1860–1880. London (Murray): 1880, post 8vo., pp. 550, maps, illustrations. Price 14*s.*

Apart from the botanical and medical aspects of this work, and the great general interest attaching to its subject, it contains the chief features of the author's own explorations in South America (from his former work 'Travels in Peru and India'), with accounts of those of other chinchona collectors, especially of Mr. Cross in the forests of Pitayo and Caqueta and elsewhere in Colombia. The special physical features of the various localities in British

India, Burma, and Java, in which chinchona is now cultivated, are discussed in detail; and a copious bibliography of the subject is added.

The appendix contains information on Caouchouc cultivation in British India, with observations on the introduction of Peruvian cotton, maize, and quinua.

The maps show the chinchona regions of the Andes, the author's track, and the plantations and lines of rainfall in India.

POLYNESIA.

Anderson, J. W.—Notes of Travel in Fiji and New Caledonia, with some remarks on South Sea Islanders and their languages. London (Ellissen): 1880, 8vo., map, coloured pls.

An account of recent personal experiences. Some observations on the nickel deposits in New Caledonia appear of interest.

Cooper, H. Stonehewer.—Coral Lands. London (Bentley): 1880, 2 vols., 8vo., pp. 349 and 370, photographs. Price 1*l.* 8*s.*

The first volume contains a lengthened account of the present social, commercial, and political aspects of Fiji, with some descriptions of its animal, vegetable, and other products, and short historical references. Extracts from Seeman's Report on the Flora are given in the appendix, with some notes; followed by observations on gold in Fiji, customs tariff, &c. Vol. ii. describes the Samoan islands, Tonga, and the Solomon and Society islands, with special reference to their products and capabilities, and a general dissertation on the future and languages of Polynesia.

AUSTRALASIA.

Quirós, Pedro Fernandez de.—Historia del descubrimiento de las rejiones Australes, publicada por Don Justo Zaragoza. Madrid: 1880, 8vo., tom. ii., pp. 432. (*Dulau:* price 7*s.*)

Vol. i. was published in 1876.

GENERAL.

Bryce, James, and Johnston, Keith.—The Library Cyclopædia of Geography, Descriptive, Physical, Political, and Historical, forming a new Gazetteer of the World. New edition, thoroughly revised, and greatly enlarged. London and Glasgow (Collins): 1880, sm. 4to., pp. 929, woodcuts, plans. Price 15*s.*

Dr. Bryce died before reaching further than the end of the letter M; and his successor, Mr. Keith Johnston, who was responsible for the remainder, has not lived to see its publication, the preface by him being dated so far back as 1878. Many of the articles are by specialists, such as Drs. Carpenter, Brown, and G. Smith, Mr. Ravenstein, and Miss Bird; and Mr. Johnston was also assisted by Mr. Turner, of the R.G.S. staff. Much of the first edition is omitted.

Jones-Parry, S. H.—My Journey round the World, viâ Ceylon, New Zealand, Australia, Torres Straits, China, Japan, and the United States. London (Hurst and Blackett): 1881 [1880], 2 vols., 8vo., pp. 312 and 295.

A record of personal incidents of the most superficial nature in beaten paths.

Kaltbrunner, D.—Aide-Mémoire du Voyageur: notions générales de Géographie mathématique, de Géographie physique, de Géographie politique, de Géologie, de Biologie, et d'Anthropologie, à l'usage des Voyageurs, des Étudiants, et des Gens du Monde. Zürich (Wurster): 1881 [1880], 8vo., pp. 525, 25 coloured maps and pls. (*Dulau*: price 10*s.*)

Intended as complementary to the same author's 'Manuel du Voyageur,' this work is considered to be a portable encyclopædia on the subject of geography and its accessory branches, the use of which by those who travel for instruction is to enable them to do away with scientific preparation.

Payne, E. J.—Voyages of the Elizabethan Seamen to America. London (De la Rue & Co.): 1880, post 8vo., pp. 396.

The voyages of Hawkins, Frobisher, Drake, Gilbert, Amadas and Barlow, Cavendish, and Raleigh, thirteen in all, and extending from 1562 to 1595, are here selected from the original narratives in Hakluyt's collection, and arranged chronologically, with historical notes.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Hauer.—K. K. Geologische Reichsanstalt geologische Übersichtskarte von Bosnien-Hercegovina. Erster Entwurf nach den im Sommer 1879 unter Mitwirkung des Prof. Dr. G. Pilar ausgeführten Recognoscirungsreisen verfasst von Dr. Edm. von Mojsisovics, Dr. E. Tietze und Dr. A. Bittner. Zugleich Ergänzungsblatt zur geologischen Übersichtskarte der oesterreichisch-ungarischen Monarchie nach den Aufnahmen der K. K. Geologischen Reichsanstalt von Franz Ritter v. Hauer. Wien, Alfred Hölder, 1880. Scale 1:576,000 or 7·8 geographical miles to an inch. (With letterpress.) Price 1*l.* 4*s.* (*Dulau.*)

Kiepert, Dr. H.—Karte des Macedonischen Hellenismus, d. h. der Länder, welche von Alexander d. Gr. und seinen Nachfolgern hellenisirt wurden. Bearbeitet von Dr. H. Kiepert. 6 Bl. Fol. Scale 1:3,000,000 or 41·6 geographical miles to an inch. Berlin, 1880. (Text in griech. Sprache.) (*Dulau.*)

—— Karte des Hellenismus während des V. Jahrhunderts v. Chr., bearbeitet von Dr. H. Kiepert. 6 Bl. Fol. Scale 1:2,500,000 or 34·4 geographical miles to an inch. Berlin, 1880. (Text in griechischer Sprache.) (*Dulau.*)

ORDNANCE SURVEY MAPS.

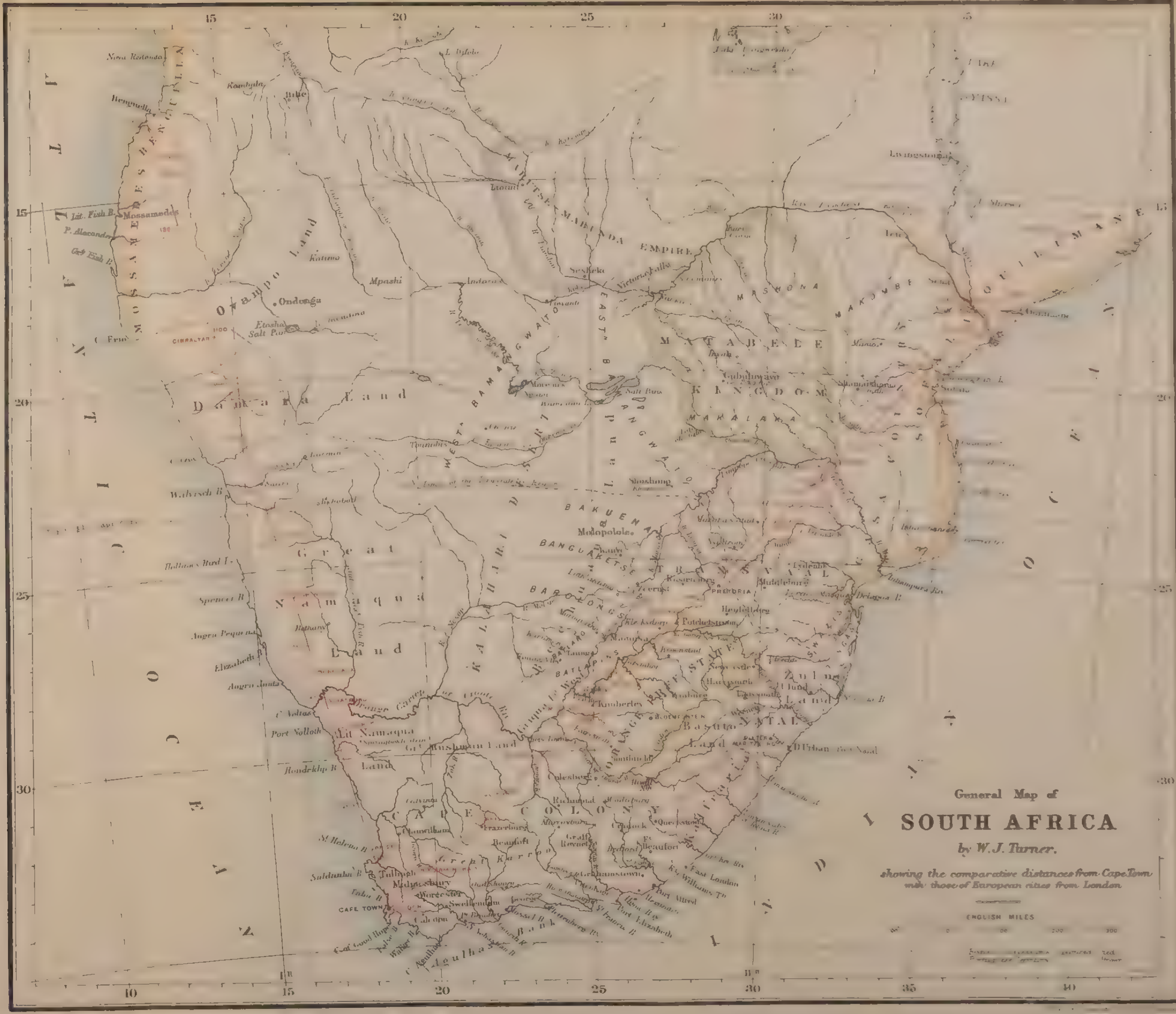
6-inch—County Maps:—

England and Wales: Essex, Nos. 60, 70, at 2*s.* 6*d*; 7, 56 at 2*s.* Wilts, No. 76 on 54 Hants, 2*s.* 6*d.*

Scotland: Ross-shire: Nos. 52, 65, 104, 119, 120, 124, at 2*s.* 6*d*; 67 and 79 on one, 109A and 115 on one, at 2*s.* Orkney and Shetland: Shetland: Nos. 10, 23 at 2*s.* Inverness: Hebrides: South Uist: No. 60, 2*s.*

AFRICA.

Petermann's 'Geographische Mittheilungen.'—Übersichtskarte von G. Rohlfs' Expedition in Tripolitanien, Barka und der Oasengruppe von Kufra, Dec. 1878 bis Oct. 1879. Entw. u. gez. von B. Hassenstein. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Specielle Darstellung der Reiseroute von Sokna bis Djalo. Construirt von Dr. G. Rohlfs. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1880. Tafel 21. (*Dulau.*)


General Map of
SOUTH AFRICA
by W. J. Turner.
showing the comparative distances from Cape Town with those of European cities from London

Pubd for the Proceedings of the Royal Geographical Society 1881

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Geographical Results of the Afghan Campaign.

By Captain T. H. Holdich, R.E.*

(Read at the Evening Meeting, December 13th, 1880.)

When, late in the autumn of 1878 our advanced guard first crossed the much-vexed boundary between India and Afghanistan, they were by no means feeling the way for an army of explorers bent for the first time on solving a geographical problem. The physical aspects of the country before them, its hills and valleys, its wide stony plains and rugged defiles, had already been very fairly represented in the plain open print of a map, which, if it could not claim scientific accuracy from having been first put together in the days when scientific military mapping was not fully understood, had yet a roll of names attached to its compilation that might be good enough to establish any nation's right to hold a high place in the field of geographical research. Wood, Burnes, and Masson, the Conollys, Ferrier, Abbott, and later still, Durand, had all contributed towards it, and it had grown in the hands of our experts at home (growing here and there perhaps a little too fast), till the outcome of the experience of all these pioneers of English influence in Central Asia had become a record which, on the face of it, did not appear to leave much to future explorers, unless explorations could be carried along entirely fresh lines of research. There were many wide blank spaces untouched, large gaps unfilled in the very heart of the country, but there was no great probability that a military occupation of Afghanistan would touch other lines than those already well indicated, if not well mapped. And the support of geographical research was but a minor, though not unimportant, point to be held in view by the chiefs who guided our divisions and brigades. There was, however, good hope that new methods allied to new bases for the extension of exact measurements—such bases, indeed, as never existed before—might once and for all time bring Afghanistan into the field of Indian surveys, and leave records not only of the topography of all the important lines traversing the country, but might define the absolute geographical position of many important natural features, lying far beyond the area of our military occupation, such as should hereafter lend to explorers on the west that same initial assistance which we ourselves found ready to our hands on the east. This is what we found already accurately fixed in geographical position, the basis from which all Afghan surveys extended. On the north were long lines of peaks defining some of the principal southern spurs of the Hindu Kush, themselves forming those minor ranges which encompass the valleys of the Kabul and the Kunar; some of them, covered with perpetual snow, were the glittering sentinels which safeguarded the secrets of Kafiristan, while others overlooked the lines of route through the Khaibar and the Kurram, and watched the march of our armies to Kabul. South of the Kurram, and stretching down in a long line parallel to the Indus, the most prominent peaks of the Sulimani range had been well fixed from the bases of the Indus Valley triangulation; while south of these again, round about Quetta, some of the most important groups of the Beluchistan and Khelat hills gave us the necessary data for our operations. All these peaks had been well fixed by long shots from short bases included within the great triangulation of India, and from them as starting-points, further geographical surveys were run wherever the advance of a brigade or the course of military operations gave an opening to a surveyor with his plane table. I will not enter on a long detailed list of all the geographical surveys which have been completed in this way; the work, we hope, is still growing day by day, even though our armies have been withdrawn. From 25,000 to 30,000 square miles is the total of finished mapping, some of which is simple geography, but much of it bears on important strategical questions, which have yet to be considered; and we have further secured on the far west a knowledge of the absolute geographical position of another wide series of well-marked peaks, which may help hereafter to extend our maps to the very banks of the Oxus, and enable us to join hands with the Russian surveys of Central Asia. But we have still to unravel many a tangled geographical knot, although I venture to think that whatever may be the future of Afghanistan—a future which seems to be brightening day by day—we have already secured, during the last two years' campaign, the key of many of her hidden places, and Afghanistan, from Kafiristan to the rugged wilderness of Hazara, will ere long be an open map to us.

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* For Maps, vide 'Proceedings,' vol. i. pp. 80, 160, 224; vol. ii. 272, 592.

With the general appearance of the map of Afghanistan we are all of us by this time sufficiently familiar; nor are those differences in detail of delineation in its topography which are due to more accurate surveys, such as can be easily described in a short paper. But it will be interesting to note some of the chief results of geographical inquiry in this corner of Asia, all the more that a consideration of the main features of Afghan geography which have lately been much distorted, bent, and twisted to suit the exigencies of political party, can never be entirely separated from some of the chief political problems concerning Afghanistan.

Afghanistan is but an outlying province of the great Central Asian plateau, from which Hindustan is but a much-depressed promontory jutting out southwards into the ocean. From the very frontier of India the first steps into Afghanistan rise through rugged passes on to this plateau, and from it again throughout the length and breadth of the country there is no descent. In a well-remembered speech at the last elections the approaches to Afghanistan were described as consisting for the most part of the beds of rugged and precipitous rivers leading into a region of hill ranges, which rise higher and higher to the limits of perpetual snow. This is true so far as there is not an approach from India into Afghanistan, that I know of, that does not follow the line of a water-course from the plains to the plateau; but under most ordinary circumstances the course of a river affords the best chance for road construction through any country of any sort whatever, and what is true of Afghanistan is true of any mountainous country. What we have learnt chiefly in connection with them is this—that most excellent roads are easily constructed along even the worst of them, and that these same river beds offer facilities for reaching the interior of the country from India, towards the south, to an extent that was certainly unexpected. We knew of the passes of the Kabul, the Kurram, the Gomul, and the Bolan; but we did not know that there were others innumerable between the Bolan and the Gomul, many of which must now be termed practicable, if not absolutely easy.

Nor is it easy here to define the change which must for the future be allowed in any military geographical description of a country, due to alterations effected in the portability of our artillery. The introduction of the mountain gun must almost lead to the introduction of a new classification for difficult or impassable country. The latter may be said almost to have disappeared, while of the former it is fairly a matter of argument whether any country that we have manœuvred through during the last two years should really be called formidable. From a geographical point of view we need no longer look on Afghanistan, or the passes which lead either into or out of it, as barriers in the way of advancing armies in any direction in which they may please to move. It is no longer the mere accident of mountain and valley which entitles us to decide on a defensible frontier.

The characteristics of the Bolan must now be tolerably familiar to all, and they repeat themselves with but slight modification in those lying between it and the Gomul which have, so far, been explored. The very first pass north of the Bolan which offered itself for examination was pronounced suitable for railway construction, although it winds amongst the skirts of the highest and most formidable hills of Southern Afghanistan. From the river Indus about the latitude of Dera Ghazi there is the choice of several routes leading into the Borai valley, and to the head of the Pishin ; while northward of this again we have the route from Dera Ismail viâ the Gomul River either to Ghazni, or viâ the Zhob valley and Maruf to Candahar, which probably forms the most perfect natural highway of them all. There is not one of these routes that is not already open to an advancing force from India equipped as the late Kabul-Candahar division was equipped —without wheeled artillery—not one of them that presents any serious difficulty after that first step upwards from India to the plateau has once been surmounted, and all of them are more or less indebted to the openings afforded by rivercourses for their existence.

There is, however, one peculiarity of geographical construction which somewhat interferes with what would otherwise be the almost universal rule in Afghanistan, that the course of the main river offers the best opening for the course of her main roads. For instance, the natural highway to Kabul would be more or less defined by the course of the Kabul River, but for the curious deflection of the line of watercourse here and there right across, and through, some of the local lines of watershed. The geographical conformation of Afghanistan on the whole is irregular. The main ridge of the Hindu Kush, which on its northern boundary runs about north-east and south-west, takes a slight bend to the southward, from a point north of Charikar, and, merging into the main watershed of this part of Asia, continues with a more general southerly trend to the Irak Pass, and thence more directly west towards Herat. From a little north of the Irak Pass a subsidiary but most important watershed strikes off nearly due south almost to Ghazni (where the Sher-i-dana Pass crosses it), and thence may be readily traced across Afghanistan till it connects with the Safid Koh range south of the Kabul River. Enclosed within this system, which may be called the Kabul basin (and which, with the Kurram basin, is generally known as Northern Afghanistan), are a mass of minor ranges, separated for the most part by fairly wide cultivated valleys, which differ greatly in characteristics of climate and construction from the wide open plains of Southern Afghanistan, where the general level of the plateau is lower, the climate hotter, and the minor watersheds are formed by narrow and more regular ranges which preserve a local parallelism which occasionally (as in the Sulimani ridges) is almost absolutely exact.

Now the drainage of the plateau where it makes its way to the low level of the Indian plains, has to find a south-easterly exit, and must every now and then either wind round the bases of those ridges which throughout Afghanistan, but more distinctly in the south than the north, preserve a north-east and south-west trend, or it must cut straight through them. They lie, in fact, in many parts at right angles to the general direction of the drainage to the Indus. Herein lies the origin of many of the chief defiles (or *tangis*) in Afghanistan, and herein too the only difficulty of following main rivers in making main roads. The most remarkable instances are found perhaps in the case of the Kabul River, which cuts right through the Kenjil range at the Tangi Garhu, and there forms a defile into which no man has yet penetrated, and subsequently both enters and leaves the Lughman valley through very similar defiles; and in the Dargi, which cuts through the Pil Mountains, and subsequently forms the Chapar rift on the proposed line of railway, with a certain suddenness of change in its course which was almost disconcerting to the surveyor who had followed it up patiently from its source, only apparently to lose it in some vast underground chasm. We might naturally expect to find some of the most formidable of these defiles at the very threshold of Afghan territory, where the first step occurs from the plains to the plateau—and we do find them there. It is not with the defiles of the interior of Afghanistan, where the rivers run from valley to valley through passes such as are familiar to us on the Logar or the Borai that we need look for any great obstacle to the movement of troops; but it is where the watercourses break down through the frontier barriers that the chief difficulties in road making will always lie. These difficulties so far have proved by no means insurmountable—hardly even formidable—and they diminish in importance the further we get from the Indian frontier.

Of a great country like Afghanistan, so full of apparent contradictions and so incongruous in its component parts, it must always be a matter of almost hopeless difficulty to convey an adequate general idea to the public mind. A few injudicious letters, or a few preposterous pictures from irresponsible sources in our illustrated papers, will serve sometimes to convey about as false a notion of the *general* characteristics of the country as can well be conceived. Afghanistan, viewed from the mountain-tops, leaves perhaps different impressions from those gathered in the narrow valleys which enclose its high roads. On the whole, the impression of its southern landscape is one of hard uncompromising outlines defining regular ridges and ranges, following tier on tier into infinite distance with nothing of grandeur of form or altitude to relieve them. Vegetation is almost entirely wanting, and hard as is the outline, harder and harsher still is the general colouring of this dust-covered land. What can be more dreary and dull than those vast stony plains stretching out in dusty monotony between the Khojak and Candahar, barely redeemed from absolute oppressiveness by the few scattered huts, or blanket villages of a nomadic population? When writers like Burnes or Masson conjure up with skilful word-painting scenes of grandeur and beauty, we must remember that they wrote chiefly of the northern provinces, which are more or less allied in physical appearance to the Himalayas, and parts of which have been transformed by the labour of centuries, and by a skill in the science of agriculture and irrigation quite unequalled in India, into perfect gardens of beauty—narrow fields of fertility such as hardly even the plains of Lombardy can boast. But it is from the mountain-tops alone that one becomes aware how narrow are these bright green ribbons of fertile beauty, winding and spreading here and there into broader plains amid the desolation of the hills, and the weary wildernesses of sand and rock. So much of Afghanistan consists of land that must be unproductive through all time, that whatever the revenues of the country may at present be, it is only too abundantly certain that they can be increased no further by the spread of agriculture; nor do I believe that the cultivators have much to learn in the science of making the most of their narrow strips of cultivable land. The art of irrigation in particular, both by open cuttings and by the underground system called karez, has been brought to great perfection. It may, in truth, be said that the Afghans use up their whole water supply. It is a fact that both the Kabul River and the Har-i-Rud which waters the plains of Herat, are now absolutely dry at certain seasons of the year. So far, indeed, the resources of Afghanistan have been fully developed. But though their total area is limited, these narrow bands of cultivation stretch far; winding into nearly every valley, and occasionally broadening out on to open plateau between the mountain ridges. Scattered among the fields are well-defended and thickly populated villages, which are connected by fairly good roads, so that a traveller might well pass through Afghanistan from end to end and describe it as a very Italy in Asia. Here and there, indeed, it is distinctly Italian in character. Any one who has strolled from Florence towards Fiesole or Vallombrosa, passing first through the narrow high-walled lanes which conduct him past the suburbs, and thence, from the gradual ascent to Fiesole, has turned to look at the matchless scene below him, will probably ever remember some of its chief characteristics. Terraced vineyards sloping step by step down the lower spurs of the hills, with villages climbing and clustering into the water-worn ravines, towers showing brightly in the evening sun, amid the olives and the orchards of the low-lying lands that border the Arno, the glint of the river, and the glitter of the snow-capped peaks of the purple mountains beyond—even the same soft light to mellow the whole picture into harmony—all this may be seen, with just a few of those slight changes with which nature always varies her pictures, among the skirts of the mountains—the Koh-i-daman—about a long day's march north of the city of Kabul. It is from Kabul itself that we get, perhaps, the most comprehensive view of the Hindu Kush. The Hindu Kush, throughout the whole length of it visible from any part of the Kabul plain, or its approaches, is not by any means an imposing range. No part of it is snow covered, except for a few months in the winter; there are no grand peaks, no magnificent altitudes. Previous estimates of its general altitude must be reduced by from 1000 to 2000 feet at least; although the measure of the absolute altitude of a pass above sea-level really signifies little or nothing as to its accessibility or natural difficulty. It is more to the purpose to estimate probable gradients and its possible roughness and ruggedness, and to know the general level of the plateau from which it springs, and the nature of the barrier it crosses. It must be remembered that in Northern Afghanistan the general level of the plateau is from 6000 to 7000 feet above sea-level, and many a pass, or *kotul*, connecting one system of drainage with another, is but an open passage over slightly rising ground which, although it may represent an abstract altitude of 7000 feet above sea-level, involves little or no gradient at all.

The Hindu Kush is crossed by mountain paths at intervals along its whole length from the Irak Pass, leading to Bamian, to the Khawak Pass, which may be defined as the limit of the range visible from the plain of Kabul. From a little north of the Irak Pass, whence springs that watershed already described as extending southward to Ghazni, and then irregularly eastward to the Safid Koh, there also branches off to the northward another well-defined range called the Paghman, which is parallel to the Hindu Kush, and just about equals it in height. The narrow valley between the two ranges is called the Ghoreband. It is the foot of the Paghman which forms the true Koh-i-daman or mountain skirts, and which includes all the most important villages north of Kabul. Nearly every large village, such as Farza, Istalif, or Charikar, is connected with the plains of Turkistan lying beyond the Hindu Kush by a pass (locally called "Durra"), at the foot of which it lies—a pass which rises first over the Paghman and then across the Ghoreband over the Hindu Kush itself. These passes cannot be called easy. They are, of course, only open (as are all the passes of the Hindu Kush north of Bamian) for about eight months of the year; there is a double ascent and descent involved in their passage, and yet (speaking partly from personal observation and partly from native authority) every one of them is passable by Kuchi camels carrying loads. If we have learnt anything at all during the campaign, it is that where a load-carrying camel can go, there a lightly equipped force can follow. Of the pass called Sar-Alang, direct from Balkh to Kabul, we have also learned something, from the passage of Abdul Rahman's exceedingly ill-equipped force across it. An Afghan army encumbered by baggage, and with no regular transport system, is by no means an easily movable force. Its mobility really depends on the facility with which all baggage may at times be dispensed with, when each Afghan soldier becomes his own commissariat officer for the time being, carrying his own supplies, or at any rate making his own arrangements for food and shelter. Yet the passage was accomplished without loss, and with no great difficulty.

East of the Khawak, the Hindu Kush rises into a really formidable mountain chain. It is unfortunate that the high altitude of its southern spurs has hitherto greatly interfered with the chance of observations to its main ridge between the Khawak and the Nuksan; but there are reasonable grounds for the conclusion that the height of it increases gradually eastwards till we arrive at peaks of truly Himalayan proportions. The height of Tírich Mir, which is close to the Nuksan Pass, is fixed now at 25,000 feet above sea-level, from observations which have been taken from the side of Ghilgit, and others have been seen not far west of Tírich Mir which cannot differ by many thousand feet. We shall know more about it when we have more closely studied the geography of Kafiristan. It is not only the increase in altitude, but other physical peculiarities which must affect the southern sections of these north-eastern passes (i. e. east of the Khawak), leading as they do, not on to an open plateau, as is so often the case in Southern Afghanistan, but into a mazy wilderness of subordinate spurs —lofty enough in themselves to be called ranges of mountains—that to my mind puts them beyond the limit of all probable military operations for the future. What we have chiefly to point out is that, so far as the Koh-i-daman, or the plains of Kabul, are concerned, the line of the Hindu Kush is hardly a defensible, and is certainly a most undesirable military frontier. Nor, taking as comprehensive a view as we can of the whole geographical system of Afghanistan, especially on that side of it nearest to Russia, can we any longer maintain that it offers very serious geographical obstacles to the movements of a modern well-equipped division. Everything new that we learn day by day but tends to diminish the value of the supposed barriers between Afghanistan and its north-western neighbours. And Afghanistan is, as we have said, but a corner of the great Central Asian plateau, possessing minor systems of hills and mountains of its own, which are everywhere accessible except in the extreme north, and which leave wide intervals of flattish plateau between them, in all directions traversed by most excellent natural roads and passes. Here and there cultivation and irrigation bar the way to local tactics; but, with the exception of the wilderness of northern hills encompassing the rugged peaks of Kafiristan, it would be hard to find another country possessing roads of equal length and of superior military capacity to those of Afghanistan.

In Afghanistan the influences of the physical peculiarities of its geography on the national characteristics of its people are peculiarly marked. Never, perhaps, has any country been the focus of so many converging streams of invasion and immigration as Afghanistan; and the great tribal divisions formed by these successive streams have found in Afghanistan a distribution of hill and valley peculiarly well suited to their continued existence. Each new-comer originally found a slice of territory into which it fitted, and where there was a possibility of maintaining a sort of national independence in spite of fresh arrivals and new claimants. But as time wore on, the usual amalgamation took place to a certain extent along the edges of provinces occupied by contiguous tribes, so that, independently of great tribal divisions, and more important perhaps than them, we find provincial communities of a mixed character occupying just the fairest and most fertile strips of Afghan territory. The topographical feature of well-marked rocky ridges which can be made a most excellent defensive line, enclosing fairly wide areas of cultivable plain land, approached only by the natural drainage outlets (or *tangis*), helps largely towards this segregation of the people into provincial masses, of which the units are drawn from two or three adjacent tribes who have their headquarters in the fastnesses of the neighbouring mountains, but who are banded together by an immediate interest in the cultivation of the same bit of territory.

Thus the Logaris who occupy the Logar valley include Ghilzais and Tajiks, the one a Pushtu and the other a Persian-speaking race, just as again the Lughman valley holds Ghilzais, Tajiks, and Hindus classed together under the one term Lughmani, and bound together in the same feuds and the same agricultural interests. When a provincial quarrel springs up, it is between the Logari and his neighbour of the nearest valley—the Wardaki, or the Kabuli—rather than between the Ghilzai and the Tajik, and yet the Ghilzai warrior probably holds the Tajik in as supreme contempt as the Tajik again holds the Hazara Shiah—the slave of the whole community. It is just this provincial massing of the people which forms, I believe, both the strength and the weakness of the Afghan government, a government which can only be described as feudal. True that the Ghilzais do hold a large tract of hilly country in the heart of Afghanistan which may be called their own, as do the Hazaras, or the Duranis, or indeed most other of the Afghan tribes; but still I believe that it is to the *territorial* rather than the *tribal* communities that we must look for the real support of the Amir's government. It is not the influence of any one Ghilzai or Durani chief that can raise a formidable opposition; it must be a combination between Ghilzai and Kabuli, Logari and Wardaki, Lughmani and Kohistani, which alone can revolutionise the country. And this again leads to an individual independence of thought and character which can only spring from the social mixture of race with race. Certainly not in free England has the private individual so strong a voice in the government of his country as he has in Afghanistan. His own right arm will enforce his vote; and even the most apparently unimportant provincial chief must have his opinion consulted before any great political move can be made. Every Afghan is a diplomat by nature and education, and he has accordingly a perception of the political interests of his country which, for clearness and keenness, has no counterpart whatever among the lower orders of England. The Sirdar indeed may propose, but it is the people that dispose. The Sirdar may be at the head of a semi-disciplined force, with some appearance of cohesion and uniformity about it; but not at present, at any rate, can he be said really to command an army.

His army is composed of a number of feudatory chiefs with their following, and those chiefs among them who now seem to hold the most prominent position are no longer the heads of the great traditional tribes of Afghanistan, but territorial, or provincial, rulers who often govern a very mixed race of people—the gradual result of a fusion of contiguous tribes or races, who occupy the most important and by far the richest tracts of the country in common, but still have generally preserved on either side their purity of descent. I think we need look no further than to this weakness of commanding power (unless, indeed, we wish to look further) to trace an explanation, first, of the helplessness of Yakub Khan in the hour of trial, and next to the difficulty of persuading Abdul Rahman to take his place as Amir. To this also is probably due the failure of the Shapur investment, and, more recently, the fact that Ayub Khan remained to be beaten at Mazra. And to the independence of thought and feeling generated by this distribution of power we may look for widespread and absorbing interest in the politics of their government which creates so high a degree of intelligence in individual subjects. Not even in England was the result of General Roberts's march against Ayub Khan so fully foreseen and so accurately weighed as by those local chiefs and people of Northern Afghanistan, who were best acquainted with the force of British arms, and who calculated at once that Ayub Khan's star had set when he halted before Candahar.

The geographical work done in Afghanistan may also hereafter help us much in deciphering the unwritten records of its past history, by tracing out the lines of successive waves of invasion in the most probable order of their sequence. This subject is far too intricate to follow in detail at present; but the centre of interest, as allied to the question of race distribution, appears at present to lie in Kafiristan, in the north of Afghanistan, because it is there that tradition points to the oldest races—races which first of all emerge from darkness into the dim twilight of early history: although, indeed, they clearly cannot be called aboriginal in the same sense in which that term is applied to some of the wild jungle tribes of Southern and Central India. Still, the direct ancestors of the Kafirs were in Kafiristan in the days when Afghanistan was but an outlying Persian province—when men drafted from the banks of the Indus and the plains of Kabul, were banded together under the Persian flag, and turned back from the tide of western conquest by the Athenians at Marathon. The original race has probably become modified by Greek and other northern invaders (their own traditions claiming descent from Alexander the Great), as indeed their religion has become a strange mixture of the tenets of the Zoroastrian, the Hindu, and the Buddhist; but still I believe the Kafirs of Kafiristan represent the oldest race of Afghanistan, in spite of opinions expressed to the contrary by certain eminent authorities. So difficult is it to reach Kafiristan, that all our efforts so far have been unavailing. This, of course, is chiefly due to the fierce and jealous nature of the tribes that border it, and not merely to the fact that Kafiristan is geographically the most inaccessible and the furthest removed from the influences of civilisation of any province in this part of Asia. It is always in districts so situated that we must search ere we write the first page in a nation's history. Gradually driven in by the encroachments of a more powerful, because more civilised people, and diminished in numbers by the slow but apparently sure progress of the faith of Islam, the Kafirs centre on the remotest possible peaks of the Hindu Kush, and still maintain something of a national existence. Spreading out southwards from Kafiristan are various tribes—all of the same original stock, but professing a new and more rational faith. The Nimchas, Safis, and Dehgans lie on the immediate skirts of Kafiristan, and more remotely the Tajiks of Kohistan and Koh-i-daman. The comparative simplicity of the mountain-bred Kafir is entirely lost in his nearest Mahommedan neighbour, and indeed there are no professors of the Mahommedan faith so blindly fanatical or so jealous of their honour as a religious sect as are the Safi and Dehgan Sunnis, or the turbulent border-fighting Kohistanis.

The valleys which these tribes of Kafir origin inhabit are formed by some of the large snow-fed streams which drain from the main ridge of the Hindu Kush. We have looked into some of them from the neighbourhood of the Kabul River, and have been astonished at their fertility. They are narrow, of course, but enclosed within the narrow strip of cultivation bordering the stream is usually a wealth of orchards, terraced fields and vineyards, meadows, and thriving villages, which tell us that here, as elsewhere in Afghanistan, the peaceful science of agriculture must be thoroughly understood.

Of the vast intermediate tracts between Northern Afghanistan and Candahar, occupied on the one side by Hazaras—Shiah Mahommedans by faith, and Tartars by origin, speaking dialects of Persian—and on the other by Pathan or Pushtu-speaking tribes, such as the Kakar, Dumars, Waziris, and Ghilzais, it is hardly time yet to speak with confidence. Much of the wild Ghilzai country has been mapped, and the history of its people is fairly well ascertained, but the Hazara country, including the great valleys of the Argandab and the Helmund and the Har-i-rud, is as yet a *terra incognita* to map-makers, although I trust that there will soon be means of proving that it is neither so inaccessible nor so inhospitable as it has hitherto been held to be. Perhaps no time is worse for the interests of geographical research in any country than when that country is occupied by an invading force fighting with a people who are—or think they are—maintaining a desperate contest for their independence. All that can be said for the chances of the explorer is that he secures a foothold where otherwise no foothold is permissible; but that foothold once secured, there is in this case no reason why it should be definitely and finally abandoned when the campaign is over, especially when two years' occupation has led (as I most firmly believe it has) to a widespread feeling towards the invaders on the part of the people generally, that can hardly be described as toleration, but which seems vaguely to express an acknowledgment that we have been fair and honest foes, with whom friendship would be quite possible on other terms than that of invaders.

Public interest for the present centres so much on Candahar, that its position politically and strategically must, ere this, have been as fully explained as our ablest writers can explain it. Nor can geographers in India throw much new light on its value. From a commercial, political, or military point of view, Candahar is the most important point in Afghanistan; geographically it may be said to indicate the weak point of the Afghan frontier. There is no Hindu Kush between Candahar and the north-west, nor is the distribution of the hill country round Candahar of such a nature, or such an extent, as that which enabled the tribes of the north to make so formidable an opposition to us last winter.

The broad open plains which surround Candahar are not well suited to Afghan tactics. Whatever difficulty we may have in dealing with a foe whose strength lies chiefly in his power of scattering, or concentrating, as the case may be, by making use of mountain tracks and unknown hill paths, vanishes when the country becomes flat and open. To hold Kabul would mean to hold an extensive line of hills round Kabul. To hold Candahar means very little more than retaining command of the walls and citadel. The chief wealth of Afghanistan too is certainly concentrated in Candahar and Herat. Compared to Candahar, Kabul is but an arsenal, and a convenient strategical point from which to govern the turbulent northern tribes. It is not a centre of trade in any sense, nor has it the command of such grand trade routes as Candahar possesses. But Candahar lies just as easily open to approach from one side as from another.

Every scrap of geographical information which can be casually gleaned about the approaches to Herat from the north and north-west, or from Herat to Candahar, tends more or less to modify our former opinions of their difficulty and danger. And just as we happen to find geographical difficulties disappearing, so do we also learn that modern armies are rapidly developing new powers of mobility. History has a habit of repeating itself, and we shall find that the march of General Roberts from Kabul to Candahar will not be the last achievement of its sort in High Asia.

The following discussion ensued on the termination of the paper:—

Sir RICHARD TEMPLE, referring to the great facilities which the country offered for the construction of military roads as described by Captain Holdich, said that in Southern Afghanistan those facilities broke upon them a couple of years ago almost like a revelation. They had expected to find great difficulty in traversing the country, and in finding means for the transport of military stores and material. They found, however, as Captain Holdich had described, that roads could be made with remarkable ease, and from that moment their anxiety ceased. In Southern Afghanistan the country, in his opinion, was not altogether so barren in appearance, and the stony plains were not altogether so destitute of interest as perhaps might have been gathered from the paper which had been read, because between the Khojak Pass and Candahar there were, rising suddenly up from the plains, a variety of hills, some of trap and others of gneiss. He believed there were none of granite, though the gneiss rock often looked very like it; at any rate, from these stony plains there rose up straight and abrupt masses of rock of the most picturesque description, wild and fantastic in appearance. Immediately behind Candahar itself, the low range of hills was remarkably picturesque in outline, being bold, rugged, and precipitous, though not of great altitude. He could entirely corroborate all that had been said about Afghan cultivation. Famous as the irrigation cultivation of some parts of India had been for many ages, it was inferior to some of the best cultivation in Afghanistan. There was nothing in the east to equal the fruit-gardens and melon-beds of Southern Afghanistan; and no doubt the same might be said of the north. They would all agree that whatever might or might not be the political result of their military operations, at all events there had been sensible additions made to their geographical knowledge; and such geographical knowledge, when founded upon surveys such as those made by Captain Holdich and his coadjutors, would never, in the hands of Englishmen, be destitute of political importance.

General J. HILLS, V.C., C.B., said he could corroborate the statements contained in Captain Holdich's paper in almost every particular. He did not quite follow Sir Richard Temple when he took certain exception with reference to cultivation in Afghanistan, and spoke of the picturesque appearance of certain rocks and hills. Those rocks and hills, however picturesque, did not in any way add to the supplies of the country, though they might add to its beauty. Captain Holdich had referred to the trade route through Central Asia passing mainly through Candahar. No doubt that was the easiest route, but a great deal of trade from Bokhara passed through the Bamian into Kabul, and that road would always be used though the Candahar route was by far the easiest, and the trade could be made a great deal of, and would be so if hereafter the Government of England had the means of extending it by retaining Candahar. The difficulty of the passes was not very great, as regards the passage of troops, for wheeled carriage was taken over every pass leading from Hindustan into Afghanistan. It went over the Khojak and the Gwaja passes from Quetta to Candahar; it was taken over the Shutar-gardan through the Kurram valley; and the Kabul route was fairly easy for wheeled carriage. The roads were made with great facility by the engineers. It did not matter what the country was; for wherever infantry could go, it could always be followed by mountain artillery, such was now its perfect state of efficiency. With reference to the great work that had been done by the survey officers, a great deal of it came under his (General Hills') own eye when he was a staff officer with General Stewart, who gave them every opportunity of going wherever they wished. He gave them escorts, and assisted them in every way, and they were always wanting to go somewhere. Similar assistance was given them by General Sir Frederick Roberts. At Kabul, no matter how high a peak was, or where it was, there was always some officer of the survey who wished to get to the top of it; and no one went further up than Major Woodthorpe, whom he was glad to see present that evening.

General MACPHERSON, V.C., C.B., while admitting most of Captain Holdich's statements, would perhaps take exception to some of his rosy views as to the roads of the Hindu Kush. He had only been able to look at them from a distance, but he thought that Captain Holdich must have put on a pair of pink spectacles when he looked over his plane-table and talked of their fitness for military operations. He (General Macpherson) was rather an admirer of the Afghan: he was a lover of his home, and fought for hearth and home very fairly. He could corroborate what General Hills had said with reference to the survey officers. When a survey officer came, he was very often considered rather a nuisance, because his arrival was always followed by an order for an escort to get to the tops of the highest mountains. He was sure, however, that the amount of work they did, and the zeal they exhibited during the whole of the two years spent in Afghanistan, could not be surpassed.

Major WOODTHORPE, R.E., having examined more particularly the Kurram valley, could bear testimony to the facility with which troops could march up that route as compared with the Khaibar. The country rose very gradually, and the valleys were very open as far as the Paiwar Kotal, there being only a small ascent of some 1700 feet. The roads ran right across the valley up to the Shutar-gardan, which of course was the only difficult point about that route, and that was only closed about three months in the year, and only for a portion of those months. The snow did not lie the same depth the whole of the winter, but varied a great deal; therefore it would not be an absolutely impassable obstacle to a force if it was found necessary to cross it. Snow lies deeply on many portions of the Khaibar route during the cold weather. The roads from thence to Kabul were perfectly level through the low valley; there was no difficulty there whatever. General Macpherson had told them that the generals in command very often looked upon the survey officers as a nuisance. Whether they did or not in their inmost minds, they certainly never showed it, but always treated them most generously and cordially, and to the whole of the officers in command, from General Roberts downwards, the survey owed a deep debt of gratitude. Captain Holdich referred to the friendliness of the tribes. On all occasions on which he had guides from the villages at the foot of the hills which he had to ascend, he, without exception, found them perfectly friendly and willing to give all the information in their power. The only difficulty was to teach them what information was wanted; for instance, on one occasion he was trying to get the name of a river, and said to his guide, "What is the name of that river?" The guide said, "Oh! no river there." He said, "Oh yes, I can see it." The guide repeated, "You cannot call that a river, because there is no water in it." "Well," he said, "what do you call it when there is water in it?" The answer was, "It is called the Painda Khel." On his saying that that could not be so, because that was the name of the village, the reply was that the people in the village called it the "Painda Khel River"; and on pressing his guide still further as to what he called it, it appeared that he gave it the name of his village, and that he had never heard any other general name for it. He (Major Woodthorpe) then said that he wanted to find out the Shamil River: "Oh," said the guide, "that is the river you have been looking at all this time"; and so he had wasted nearly twenty minutes of precious time, because the man could not understand what was the information required. As a rule, he certainly found the people very friendly and always willing to do what they could for him.

Mr. W. T. Blanford said he had been asked to say a few words upon a subject rather different from most of the points which had been discussed, namely, as to the very peculiar features distinguishing the plateaus of Central Asia, a question, however, intimately connected with the extraordinary facility of communication between different parts of the region. The fact was, a very large portion of Central Asia consisted of enormous plains, separated from each other by ranges of hills, but occupying so large a portion of the surface, that the hills, except when they formed a complicated mass or knot, as they seemed to do round Kabul, might almost be neglected in looking over the country. The plains in many parts were of great extent, and totally different from anything in Western Europe or the peninsula of India. The first peculiarity was that no streams found their way out of them, but the whole were enclosed basins; such, for instance, was the case of the great plain into which the Helmund ran, which received the drainage of all the country round Candahar. Such was the case also with the great Aralo-Caspian plain to the north-west of Afghanistan, with Eastern Turkistan, with a great part of Mongolia, and with almost the whole of the plateau of Persia. As to the origin of these plains, very little was really known. No doubt the mountains surrounding them on all sides had been raised by some of those remarkable changes of the earth's surface to which were due the ranges on the frontier of India and in other parts of Asia, many of which were unquestionably of very recent origin; in fact, it might fairly be a question whether the formation of some of those mountains was not still in progress. The plains consisted in the middle of a large area of comparatively incoherent material, sometimes more or less covered with sand, and frequently containing either a salt lake or marsh, which received the rivers draining in from the sides, while round the plain there was an extraordinary slope, something like the glacis of a fort on an enormous scale, leading from the hills to the edge of the plain. The first idea that would strike any one on seeing these plains, was that they must have been the beds of lakes, and such was most certainly his own impression when he came across some of them in Persia in 1872. The fact that a small lake not unfrequently remained in the centre of the plain would rather induce people to believe at first that these depressions had been formerly occupied by a much larger lake, and that the amount of rainfall having diminished, the water had gradually dried up. Considerable light, however, had been thrown upon the formation of the deposits in these plains of late years by Baron Ferdinand von Richthofen, who had examined a large number of them in Northern China, and who suggested that these basin-shaped plains had been filled up mainly by the action of the wind. In these exceedingly dry countries, although the rain that fell was of small amount, it was nevertheless sufficient, aided by the carbonic acid of the air, to disintegrate the rocks, and produce upon the surface a large quantity of incoherent material, which was carried off by the winds; and many travellers had described the wonderful dust-storms occurring over these elevated regions. The sand, of course, was gradually deposited, and enormous thicknesses were to be found, the deposit having the peculiarity of being almost entirely void of stratification. This view had been supported by Dr. Tietze, who examined some of the plateaus in Northern Persia, and no doubt there was a great deal in its favour. Of course all considerations of that kind added very much to the interest connected with the geographical examination of the countries of Central Asia, not only on account of their own intrinsic interest, but because it was by no means improbable that a portion of Europe at a recent geological epoch existed under similar conditions, and the loess of the Rhine and Danube valleys may have been formed in the same manner as the wind-transported deposits of the Asiatic table-lands.

Lieut.-General Sir H. THUILLIER could add nothing to the details given of the geography of the country under discussion, but was glad to be permitted to bear testimony to the manner in which their gallant survey officers performed their duties in Afghanistan, at the imminent peril of their lives, and also to the admirable results they had produced, which would add materially to the rectification of the map of Afghanistan. Captain Holdich and Major Woodthorpe had carefully abstained from alluding to the smallest difficulties, but both those officers had gone through such escapades as would cause a thrill to pass through the audience if he had the time or the means of describing them. Major Woodthorpe especially, in addition to his deeds of geography, had performed such deeds of valour as would entitle him to the plaudits of so distinguished an assembly. Both officers had been many years under his particular notice, and he could state that not only in Afghanistan had Major Woodthorpe performed these duties, but also in the Naga hills amongst the savages of the extreme north-east of India under peculiar risk and difficulties. Both officers had fully established the reputation of the Survey Department of India, and for the good work they had done in Afghanistan we were under obligations to the military commanders of the expedition who favoured geographical research so heartily, viz. Sir Frederick Roberts and General Macpherson.

The CHAIRMAN (Sir Henry Rawlinson) said the paper to which they had listened was, from its general character, one of the most satisfactory essays that had been read at a meeting of their Society for a very long period. He agreed fully with Captain Holdich in the greater part of his observations, but there were still a few points on which there might be a slight disagreement, and which it might be as well therefore to notice, with a view to eliciting some further explanations. In the first place, then, with regard to the difference of races. Captain Holdich's view was that the different nationalities had been mixed so much together that all distinction now rather depended upon locality than upon race. In his (the Chairman's) experience of Afghanistan, he had always considered there was the greatest possible distinction of race, that that was indeed a far more striking, more prominent, and important distinction than a mere difference of locality. For instance, the old Persian inhabitants, who were called Parsiwáns in Southern Afghanistan, and the Tajiks or Dehkans in Northern Afghanistan, could never be amalgamated with the Afghans. There was a distinct difference between them, of race, manners, language, and often of religion, and they (the English) used to find it very important to balance one of those parties against the other. In the first Afghan war, forty years ago, it was owing to this difference of race and to the good feeling of the Parsiwán population as opposed to the Afghan, that the British were able to obtain supplies and maintain their forces at Candahar. It must be remembered that during the troubles in Afghanistan after the loss of Kabul in 1842, the English troops in Candahar were for eight months cut off altogether from Quetta, and left entirely dependent on the country; and they were enabled to obtain provisions mainly through the assistance of the Parsiwáns of Candahar, who supplied them chiefly from the feeling of animosity they entertained towards their Afghan masters. He could understand that in certain districts the inhabitants might have been fused together to a great extent, and no doubt Captain Holdich had drawn his inferences from that circumstance. Mr. Elphinstone had himself remarked in his view of the tribes that the neighbours or "hamsáyehs" of the great tribes were under the protection of those tribes, and were gradually becoming amalgamated with them, at any rate politically. Another question referred to was that of irrigation. Captain Holdich thought the Afghans had used up all their water supply, and as far as mere external observation was concerned, he would admit the force of the remark. He could not help, however, believing that subterranean aqueducts might be brought out from the hills anywhere and to any extent. It was the same throughout all Persia; wherever there were hills there was water. It was merely necessary to tunnel the base of a hill, and they invariably came to springs. He believed, therefore, that it was quite possible to increase the water supply (and consequently the means of subsistence) three or four fold beyond what it was at present in Afghanistan. He never knew either in that country or in Persia an attempt to construct a "karez" failing; they could always by steady work reach the water and bring out a fine stream, as was the case at Maiwand, where a magnificent river came out from the hill through one of these subterranean aqueducts close to the field of battle. With regard to the passes of the Hindu Kush, a good deal of information had been previously collected, and no doubt Captain Holdich and other members of the Society were aware that papers had been recently read on the subject, giving a very fair account of the whole of them. The passes were very much as Captain Holdich described them, the gradients being easy throughout; but they were at high elevation, and there was great difficulty in obtaining supplies, as for some months of the year the whole of the region was covered with snow. The elevation varied from 12,000 to 15,000 feet, and though this did not render the march of an army impossible, still it gave rise to great difficulty. The principal point, however, that he wished to refer to was the great value of such information as Captain Holdich and Major Woodthorpe had collected. His own recollections went back forty years to the old Afghan war, at which time there was no provision whatever made for the acquisition of geographical knowledge. The Quartermaster-General's Department certainly was required to lay down the routes of the army, and to obtain all necessary information with regard to supplies, but as for any regular survey, or having officers of the Survey Department attached to the force, there was nothing of the sort. No doubt General Thuillier, as head of the Survey Department in India for so long a time, must be able to realise the gradual awakening of the Government on this subject, and to appreciate the change which has taken place from those days of darkness to the present days of light. A great deal of this improvement was caused by the experience derived from the Franco-German war. It was well known that the Germans at that time had an accurate topographical knowledge of France, very much better than the French had themselves, and they derived enormous military benefits from that knowledge. Now, engineer officers supplied by the Surveyor-General in India were attached to the forces for the express purpose of acquiring geographical information; and though, as General Macpherson had graphically said, such officers might be considered somewhat of a nuisance when there were more important military operations to be looked after and when it was not agreeable to have to send an escort with an engineer officer merely to get to the top of a neighbouring peak, still in the long run it was of great benefit to the public service. The results of the engineers' observations were most valuable, and he must repeat that he regarded the vast acquisitions to their geographical knowledge which had been derived from the Afghan war, as one of the most, if not the most, valuable result of that war. He was further glad to hear a hint that the source of their geographical information was not likely to diminish, now that the war was nearly brought to a close. That hint, of course, referred to the invaluable system of geographical exploration organised in the Survey Department of India, by which, through the employment of native explorers, they had obtained such admirable results in Tibet and the Upper Oxus, and which now they hoped was being applied to the unknown regions of the valley of the Helmund and Argandab, and other parts of Afghanistan which European explorers could not venture to visit. If that was the case, they might confidently expect that in the course of a few years they would have as complete a map of Northern Afghanistan as they now had of Southern Afghanistan. It was greatly to be regretted, from a geographical point of view, that during the late operations no opportunities had occurred of extending scientific researches into the country north of the line between Kabul, Candahar, and Herat. All that portion of the country, from the Argandab valley in the south, to Turkistan and the valley of the Oxus in the north, had hardly been touched, so far as survey went. It was, nevertheless, a most important country, and they must depend on native explorers for filling up the blank. It had been observed that the position of Candahar was well adapted for promoting commerce between India and the centre of Asia, but its strategical value, which was of even more importance, had hardly been touched upon. It stood exactly in the centre of the highroad between Western and Eastern Afghanistan, completely commanding the passage from Kabul to Herat. It was impossible indeed for an army to pass from one place to the other without being met or opposed at Candahar. That was a very important consideration, and one which no doubt Captain Holdich was perfectly aware of, although he had not particularly drawn attention to it. Perhaps these few observations might elicit some further explanations from him, which were sure to be of interest and value.

Captain Holdich, in reply, said, with regard to the fusion of the Ghilzai and Durani tribes and others, he did not mean to indicate that there was any intermarriage between them: they collect together on the same ground, and the ground where they met generally happened to be cultivable country, and in their common interests they were banded together. They lived in separate villages, but the villages were so interspersed that they could not tell in a cluster how many villages belonged to Ghilzais and how many to the Tajiks, and while they kept their own purity of descent intact, they still mixed together with the common object of making the most of the ground they occupied. This fusion appeared to have increased largely of late years. In deference to Sir Henry Rawlinson's long experience in Afghanistan and Persia, he would assume that the water supply was much larger than he had supposed, but he imagined that if they could have run more karezes they would have done so; and it appeared to him that besides the question of water supply, there was one of land supply, for they seemed to have occupied about as much ground as it was possible to cultivate already. The cultivated ground ran up as close as it could to the edge of the desert country, and whether the sandy waste round it could be turned into cultivated ground by irrigation was rather a matter of argument; certainly, if the cultivable soil could be extended in any way he should think the limits of its extension would be narrow, and as for extending it three or four fold, he thought that in Northern Afghanistan at any rate, the mere rocky nature of the soil would interpose an insuperable difficulty. He knew from bitter experience that the passes over the Hindu Kush were extremely troublesome, and the question of supplies was a very grave one; but what he wished to indicate was, that any mountain system crossed by innumerable bypaths, all of which were certainly open to loaded camels, would necessarily be a weak frontier to occupy. Of course supplies were not to be found on the passes, but that might be said of every pass in Afghanistan. Supplies always had to be collected from a distance, but they were collected, and the passes were made use of. And supposing they were inside that frontier and were awaiting the arrival of an army from the outside, it would be a very difficult question to say where they would see an enemy appear first. He knew that the passes as generally indicated in the maps to the north-west of Kabul were put at about 15,000 feet, but he believed that several thousand feet must be taken off this. With regard to the pass that Abdul Rahman came over, he should be inclined to suspect that 10,000 was nearer the mark than 15,000. It was unfortunate that no officers had been able to get there to take even barometrical observations. It was also unfortunate that in taking trigonometrical observations, it was almost impossible to detect with the telescope the exact point where the pass crossed a long range of hills, and so it was difficult to tell the exact altitude of the passes by trigonometrical calculation. Leech, who had been across, and also Burnes, gave the altitude at 15,000, but they both started with data which were now known to be rather inaccurate, namely, the height of Kabul itself. They had found so far that barometrical observations previously taken differed by a constant value from the latest trigonometrical results. They undoubtedly were valuable observations, but they must necessarily bow to trigonometrical results. They had now got a direct line of trigonometrical altitudes right up from India to the plains of Kabul, taken by two routes, which gave almost exactly coincident results; and having those results they could only suppose that there was a constant error affecting the barometrical observations previously taken. Sir Henry Rawlinson had said they knew nothing of the country north-west of the line joining Kabul and Candahar. They never got into it, and had never mapped it, but they had got some valuable results out of it by fixing a certain number of points beyond that line, and there were others fixed along the Hindu Kush, which would be seen just as far west as they saw them east; consequently, all explorations carried on beyond that line could be well checked. This made a great deal of difference in the value of the work of native explorers, because when there were a certain number of fixed points for reference about which no mistakes could be made, there could be no great difficulty in compiling their work into trustworthy form; so that they had really got the first and most valuable step in geographical inquiry already assured to them. As to the strategical position of Candahar, he purposely did not touch on that point. It was a question which he had a good deal considered, and about which he had already written a paper, which appeared in the last volume but one of the 'Journal of the United Service Institution,' and therefore he would add nothing further on that point.

Sir **Richard Temple** said no doubt the Chairman was quite correct when he stated that, as a rule, springs of water could be tapped in almost all the hills of Afghanistan, but there was a notable exception to that rule in the celebrated plain of Dasht-i-Bedaulat, just south of Quetta. That was a plain with an area of not less than 200 square miles, with a splendid soil, the whole of which might be turned into a garden if only water could be obtained. Nevertheless it continued uncultivated simply for the reason that the people with all their skill and experience in finding springs could not discover a spring in the surrounding hills. He admitted the truth of the rule as laid down by the President, but submitted this as a very notable exception. There was one point in Captain Holdich's paper to which they had failed to pay sufficient attention. He justly pointed out that the ancient belief in India had been, that there were but two great main paths, one in the north—the Khaibar, and one in the south—the Bolan. Captain Holdich had, however, pointed out with great minuteness that there was a middle or intermediate pass, the Gomul Pass. That Gomul Pass led to India not only from Candahar, but also from Ghazni, and he believed that it was by that route that Mahmoud of Ghazni, the first Mahommedan invader of India, passed from Afghanistan into the plains of India. Captain Holdich rather indicated that there was not much available cultivable land within the limits of Afghanistan. The Chairman took exception to that statement, and he entirely agreed with the Chairman. He believed that there was an immense amount of cultivable land still in Afghanistan, and if it only had the benefit of a strong, vigorous administration for one or two generations, there would be an increase of cultivation and of population also. In proof of this, he would state one historical circumstance, which no doubt upon consideration they would deem conclusive. Alexander the Great came from Persia to Afghanistan by way of Herat and Seistan and Candahar, and so got to Kabul, passing through a rich, populous, and highly cultivated country, the like of which was not to be seen in these later ages. There were ruins between Candahar and Herat which showed that there must once have been flourishing cities, and country which is now described as "stony plain" must have once been cultivated by means of tapping those springs which the Chairman had described. A study of the Greek accounts of Alexander's campaign would convince them that the country was much more cultivated then than now, and perhaps the day would come when under some great power it would become as well cultivated in the future.

The CHAIRMAN said he merely proposed to supplement the remarks made by Sir Richard Temple, by one or two illustrations. It was not generally known that the great city and capital of Southern Afghanistan, in the time of Alexander, was a perfect illustration of the argument he brought forward. The ruins of the city of Arachosia, now called *Olán Robát*, were to be found in the midst of a howling wilderness, without an atom of cultivation or a single fixed inhabitant in the neighbourhood, yet the country on the right-hand side of the road leading from Ghazni to Candahar must have been at one time cultivated throughout. The valley of the Tarnak was 15 or 20 miles across, and was now a wilderness, but as it contained the great city of Arachosia, which was the capital of the country, they might suppose that the whole of that plain was formerly cultivated. He believed that Afghanistan would sustain a population two or three times more numerous than at present existing, though no doubt to a casual observer the present appearance of the country was most desolate, especially that portion between the Khojak hills and the plain of Candahar.

Observations on New Britain and neighbouring Islands, during Six Years' Exploration. By WILFRED POWELL.

Map, p. 128.

DAMPIER, in 1699, was the first to decide that New Britain was a separate island from New Guinea, he having passed through those straits which are now called by his name, and which lie to the westward of New Britain and the eastward of Rooke Island. Some portions of the island were afterwards more exactly described by D'Urville, although this navigator visited it under very adverse weather: he gives it the native name of Birara, which I found to be the name also given to a part of the island some 200 miles to the north-eastward of that portion which he describes, a circumstance which, I think, tends to prove that at some previous date the natives of the eastern and western ends of the island were connected, though at the present time their language, appearance, and customs are very different.

Before commencing a description of New Britain I will devote a short space to the Duke of York group, which consists not of one island alone as marked in the Admiralty charts,* nor even of four islands, as shown in the German survey by the *Gazelle*, but of seven principal islands and seven smaller ones; the largest of these is Duke of York Island, which is about five miles in length, east and west, by 3½ north and south: to the extreme north of it lies Makada Island, with two small islands called Myet lying to the eastward: these, with the northern coast of Duke of York Island, form Makada Harbour, better known as Ferguson's Harbour. This is a pretty fair harbour during the south-east monsoon, but it cannot be considered a first-rate one, owing to very strong currents that sweep through the narrow passages between the islands, and the inferior holding-ground, which is mostly white and shifting sand: the average depth is from 3 to 10 fathoms.

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* This has recently been corrected by the Hydrographic Office from a survey by Lieut. G. E. Richards, R.N., of H.M.S. *Renard* in 1879.—ED.

Port Hunter is a small port on the north-eastern side of Duke of York Island, separated from Makada Harbour by a very narrow isthmus about 200 yards wide; on this isthmus is built the principal mission house and the residence of the Rev. G. Brown, situated on rising ground on the north-western side of Port Hunter, known as Mission-house Point; this port was first discovered and described by Captain Hunter. The eastern shore of Duke of York Island is for the most part steep, rising in cliffs about 100 feet above the sea, Weira Point being the highest and most easterly point. Further south lies the entrance of Mioko Harbour, which is enclosed on the southern side by three islands, namely Mioko, Utuan, and Ulu Island; this is undoubtedly one of the most sheltered harbours in this part of the South Seas; it has a small shoal lying about the centre, but there are good passages on each side of it; it has also an entrance both at the east and west ends; the harbour is about 2½ miles wide in the broadest part. To the south-westward of Ulu lie two more islands, the easternmost of which is Kerawarra and the westernmost Kubokonilick, the two being joined by a small reef and enclosing a small haven known as Kerawarra Harbour, which is dangerous for large vessels owing to the narrowness of the entrances; there are several shoals and sand patches lying to the westward of Duke of York as marked in the chart. Nearly due west of Kubokonilick lie two small islands, surrounded by fringing reefs with a deep water passage between, known as the Pigeon Islands, the native name of which is Palaccooroo.

The natives of the Duke of York group appear to be a mixture of the inhabitants of New Britain and New Ireland, who have crossed over at some former date; that is to say, I think that some tribe from New Britain, having been driven off the mainland (probably Birara), colonised the Duke of York group, beginning at the southernmost end, where they appear to be the oldest inhabitants and still hold intercourse with Birara; then it is probable they were either drifted in their canoes or went over to New Ireland to trade for provisions, and eventually bought wives there. I imagine this to be the case, as the Duke of York language more closely resembles that of Birara (New Britain) than that of New Ireland; yet the New Ireland natives seem to comprehend the Duke of York dialect when spoken to them, though it is not their own language, or at all like it.

When speaking of New Ireland I refer to that part immediately opposite the Duke of York group. In parts of this group they also have a custom amongst the women that only belongs to New Ireland, namely that of covering their loins, which seems to point to the fact of the women having come thence and continued the practice; the men go entirely naked. I cannot say that I found much more intelligence amongst these natives than in either of the other islands, although Mr. Brown has chosen it as his head mission station; but he preferred it on account of its central position rather than because of any intellectual superiority of the natives. With regard to the work of the mission, I cannot speak very favourably of the progress it has made during the four years since the missionaries first landed here, though it is from no want of zeal on their part, but rather from lack of sympathy on the part of the natives, who do not appear to take much interest in learning anything, except it be a new dance. The first two or three times that *lotu*, or religious service, is held at any fresh place, numbers come down to see what it is like, but after that they seem to get tired of it and keep away. I asked an old chief one day if he had been to *lotu* and how he liked it; "Well!" said he, very seriously, "I went to sleep, but it was not at all comfortable; I don't think I shall go again." However, going to sleep in church is not peculiar to savages. Excepting the boys at the houses of Mr. Brown and the teachers, I do not think there are ten converts among the Duke of York natives.

We will now turn to New Britain. Cape Stephens, the north-east point of this island, in S. lat. 4° 7′, and E. long. 152° 7′ 45″, is formed by a spur of a mountain called the North Daughter, fringed by a small reef running about 150 yards from the shore, on which are two or three rocks that show above high water. This is called by the natives Goonan district. The North Daughter is a volcano rising to the height of about 1700 feet. After passing Cape Stephens to the eastward, the land trends away in a south-easterly direction, forming a peninsula on which are situated two mountains known as the Mother and South Daughter with a volcano lying between them. In May 1878, during a violent eruption of this volcano, there rose in one night on the western side of Blanche Bay (a bay nearly enclosed by this peninsula), an island of considerable extent, which forms in itself a crater, filled with boiling water. The new island is semicircular in form, the centre forming the crater, and its north-eastern side having a short reef or spur of rocks which terminates in a small island covered with bushes. A week after the island had risen, in attempting to land I found the surface too hot to stand still upon; one had to keep moving along quickly to prevent the sole of the boot being burnt, the water in the crater being in a boiling condition and throwing up large volumes of steam. The eruption of the volcano above-mentioned lasted for upwards of a month, and when viewed at night from the "Mother" presented a most beautiful spectacle, huge lumps of molten pumice-stone being thrown up to an enormous height, and when they reached their greatest altitude, bursting like a rocket, emitting vast showers of sparks and red-hot stones, which destroyed all vegetation to leeward within a distance of about two miles. The crater itself seemed to be covered with a blue sulphurous flame, which rose and fell as if there were a vast pulse at work beneath. The whole surface of Blanche Bay, and a great part of St. George's Channel, were so thickly covered with pumice-stone that it was impossible for a boat or even a vessel to work its way through. Large numbers of dead fish and turtle were picked up on the surrounding shores of Blanche Bay.

The peninsula of the Mother and Daughters, which thus bounds Blanche Bay on the north-eastern side, is terminated by a point called Point Praed, so called by the *Blanche*. A little further along the southern end of the peninsula, and immediately under the South Daughter, is a small indentation of the land, in which the *Blanche* anchored, called Albino Bay on account of a false report of there being a white woman on shore here, who turned out afterwards to be an albino woman. Lying on the inside of the peninsula is an island called Matupi, which is very thickly populated with natives. In a north-westerly direction, about two miles off, lie two very remarkable rocks called the Beehives. The western side of Blanche Bay is hilly, rising to about 700 feet, crowned with coco-nut groves, and very thickly populated. The southernmost point of the bay is named Ruluanna Point. After leaving this point the land trends in a straight line very nearly due east, the whole extent of the coast-line being tolerably thickly wooded, but the country rising at the back in undulating grassy plains.

Gazelle Point, so named by the German exploring ship *Gazelle*, is the extreme easterly point of New Britain. From Ruluanna to Gazelle Point is known as the Kininigunun district, and it is within this district, near the shore, that my house is built, from which I have made several excursions inland, of which I intend to give an account hereafter. From Gazelle Point the coast trends away slightly to the south-westward, this part of the country being known by the natives as Birara; it is thickly wooded and well watered, rising at the back to a considerable height. The next principal point is Cape Palliser, in about S. lat. 4° 36′ and E. long. 152° 20′. The land here begins to fall away a good deal to the westward, and embraces several points and capes, the first of which is Cape Buller, which forms the northernmost headland of Spacious Bay. The next point of any importance is Archway Point, which is formed by a curious natural archway of rock, projecting some yards into the sea. The next is a long hilly point which stretches about three miles to the southward, due south, which I called, from its shape, Tongue Point. Along this coast, from Cape Palliser to Tongue Point, we constantly observed natives on shore, but were unable to hold any communication with them owing to their assuming an exceedingly hostile appearance on our attempting to land, using the most disgusting and obscene gestures, apparently in order to show their contempt of us; indeed, in one place where we were anchored in a small cove they came down in great numbers on the beach, and commenced to throw stones from their slings to such an extent that it was considered advisable to haul further off the shore. I may here remark, in passing, that the slings they use are composed of an oblong piece of bark, with two strings about a yard in length fastened to each end, on one of which a button of pearl shell is fastened in order that the string shall not slip through their fingers. The stone rests in the centre on the oblong piece of bark. They use these slings with great accuracy and considerable force; indeed, I have seen a native discharge a stone to a distance of 250 yards with sufficient force to break it against another.

The only difference between these natives and those on the more northern portion of the island is that they wear a waistcloth; their arms are the same, namely, spears, clubs, stone tomahawks, and slings.

After leaving Tongue Point we found ourselves entering a most beautiful bay, which I named Henry Reid Bay, after the name of the missionary steam-launch which accompanied us on one of our trips down here. The bay forms a complete harbour, measuring from Tongue Point to the western shore about 4½ miles, with a stretch of about the same extent north and south. It is surrounded by a beautifully wooded shore. On the north-west side two rivers of considerable extent enter it, the northern and smaller one called Pleasant River; the mouth of the one to the southward, only about a mile distant from the former, is large and deep; at the entrance we found a depth of from 2½ to 3 fathoms, which depth we carried with us into the river for about half a mile, and found sufficient water up the river for the steam-launch for a distance of about three miles, the course being in a westerly direction trending slightly to the northward. At this distance up the river we landed, on the northern bank, and going about 200 yards into the bush, discovered a deserted fishing village of about twelve or thirteen huts, outside which were lying numbers of empty shells of river clam, which seems to have been the object of the natives' fishing here. The huts appeared to be of fresh construction, and could not have been long deserted, though of such slight structure that I do not think the natives could have resided in them for any length of time. The banks of the river were beautifully covered with ferns, intermingled with the sago and betel-nut palms. We observed a beautiful creeper hanging from the trees, with a magnificent red wax-like flower, also a kind of gum-tree (*Eucalyptus*). Some of the most lovely kinds of Dracænas lent their colours to add to the general beauty. The water of the river was perfectly fresh at a quarter of a mile inside the mouth. We did not see any signs of the natives themselves.

After leaving the river we proceeded on our course down towards Turner Point, which is the southern point of Henry Reid Bay, on the way observing a small island lying close in to the southern shore; also, about 1½ mile to the northward, a small reef, on which there was a considerable break. Henry Reid Bay averages for the most part a depth of about 20 fathoms, though it shallows considerably towards the southern shore. Whilst anchored in the bay we observed several large hornbills flying about amongst the trees, making that curious rushing noise with their wings, like a railway train in motion, which obtains for them their native name of Banga-banga. We also observed the foot-tracks of cassowaries on the shore, and one evening we saw a small wallaby come down to the beach, apparently to lick the salt off the stones.

After rounding Turner Point we came upon a long stretch of low land, the beach running very nearly north and south, for a distance of about four miles; on it we observed a large number of natives, who were waving green branches and gesticulating to us. After we had anchored, Mr. Brown and myself determined to go on shore, though, having been so badly received by the natives further northward, we were rather doubtful of the result. On landing, the natives at first appeared to be rather shy of us, but after some little persuasion, and showing them strings of beads and red cloth, they began to venture round us, whereupon we commenced to barter for some small things they were wearing, such as armlets, necklaces, and so forth. The first man who obtained a few beads, as soon as he had them in his hand, appeared to be so much overcome by the enormity of his wealth, that he rushed off along the beach yelling like a maniac, presumably to show his friends the wonderful treasure that he had obtained from the mysterious creatures who had come to visit them. After this the others were more eager to obtain a similar treasure, and pressed round us, trying to barter everything they had on, even the very rings out of their ears. On one occasion, wishing to purchase a pig, and not knowing very well how to set about it, being ignorant of the dialect, which is totally different from that of the natives in the north, I asked Mr. Brown how I should manage, or what he thought would be the best way of making them understand. He said, "Why don't you try grunting?" whereupon I began to grunt most vociferously. The effect was magical: some of them jumped back, holding their spears in readiness to throw; others ran away, covering their eyes with their hands, and all exhibited the utmost astonishment and alarm; in fact, it was so evident that they expected me to turn into a pig, and their alarm was so irresistibly comic, that Mr. Brown and I both burst out laughing, on which they gradually became more reassured, and those that had run away came back, and seeing us so heartily amused and that I had not undergone any metamorphosis, began to laugh too; but when I drew a pig on the sand with a piece of stick and made motions of eating, it suddenly seemed to strike them what was the matter, for they all burst out laughing, nodding their heads, and several of them ran off, evidently in quest of the pig that was required. After this they were very much more friendly, and took us off to show us a village close by. When we got there it struck me at once, there being no women or children about, that it was a village that they had lately conquered, and on coming closer my idea was confirmed by large heaps of human bones lying about, all charred and blackened by fire. I picked up what appeared to me to be a shin bone, and showed it to one of the natives with an inquiring look; whereupon he snatched it out of my hand, and pointing to his own leg, put the bone into his mouth and then began munching all round it, rubbing his belly at the same time and laughing, as much as to say it was very good. Although there were such large numbers of bones about I did not see any skulls, which leads me to imagine that they take them away to their own village as trophies. There was no appearance of any one living in the houses, which I believe to be in consequence of their having the same superstition as the natives more to the northward, namely, that if a man lives in the house of an enemy who has been killed in battle, he will be haunted by the spirit of the dead man. The houses themselves were beautifully made, and far superior to any that I had seen before in the island; they were built in semicircular shape, with the roof sloping down to the ground at the back, the front being filled in by beautifully worked wicker-work, leaving a small door in front. The inside of the house was really very well decorated, for natives, with figures and designs, some burnt into the wood, and others stained with dyes made from the juice of different nuts. The village itself was built in a circle, leaving an open space in the centre, which was planted with small trees and variegated plants. I cannot account for the village being deserted in any other manner than that these natives, who were now showing it to us, must have surprised it at night, thus catching all the inhabitants asleep. We bought a good many curious implements of war and ornaments from them; they had shields, really very cleverly ornamented; their spears were the most dangerous weapons of that description that I have seen in New Britain, the points of them being tipped with cassowary's claw, and only fastened on with a kind of wax or gum, so that when the spear was buried in the body, the cement would be melted by the heat, and on the weapon being drawn out of the wound, the cassowary's claw would be left imbedded in the flesh. Their clubs are varied in shape, some being well carved with even knobs all round the end, and some, like one that Mr. Brown bought, shaped in the exact form of a billhook, though where they can have got the idea from I cannot imagine. Some of the articles of ornament were pretty well carved; these were tortoise-shell earrings, armlets of the same material, or made out of the spiral conch, and curious masks, made of network, and cleverly worked in with feathers, which they stretched over their faces when dancing. The natives themselves wore a very neatly stained waistcloth, marked in very good pattern, in most cases with the colours red, yellow, and black. All the men that we saw appeared to be circumcised, except one old man who wore no waistcloth, and who had an air of great authority amongst them, though I do not think he was a chief, but rather a wind-maker or doctor.

In bartering with them I found that they did not know the use of iron hoop, so much prized by the natives of New Guinea, nor did they seem to care about a tomahawk when I showed it them (they themselves using stone tomahawks). They would only barter with us for beads and red cloth—a circumstance which seems to me pretty conclusive that they can have had very little, if any, intercourse with white men.

Return Point, at the bottom of Spacious Bay, was the furthest we visited on this side of the coast. Captain Hunter mentions Spacious Bay in these words: "At noon we found ourselves ten miles to the E.S.E. of Cape Buller before a deep embayment which exists between Cape Buller and Cape Orford, and which, in this part, must reduce the connection north of New Britain to a narrow isthmus; the deep and spacious bay spoken of above was not sufficiently explored to affirm that it does not disconnect the two portions of New Britain, but if so the channel must be narrow and was not distinguished from the offing."

We will now return to Cape Stephens, and travel westward along the northern coast of New Britain. As I said before, Cape Stephens is formed by a spur of the North Daughter, which is evidently formed by volcanic action, and is called the Goonan district; this district extends about three miles along the coast, which trends nearly in a S.S.W. direction. There is good anchorage along the whole of this coast during the south-east monsoon, but the best is about two miles to the southward and westward of Cape Stephens, about a quarter of a mile from the shore, and is distinguishable by one remarkable green tree standing by itself close to the water's edge. The next district is known by the natives as Ruterwool; the coast still trends in the same direction, the shore is low and shelving, but the country inland is composed of hills of volcanic appearance about 500 or 600 feet high; coco-nut groves cover the coast and hills at the back. About four miles from Cape Stephens along this shore, off a slight elbow in the coast-line, there lies a small shoal about 500 yards from the beach. To the southward and westward of this shoal there is good anchorage in the south-east monsoon. Next is Tarlily Bay, so named after the chief who lately caused the Rev. G. Brown so much trouble by murdering and eating four of his teachers, as it is in this district and on this coast that his possessions lie. It is formed by the south-western part of Ruterwool on the east side, and Junior Mission-house Point on the west. The shore is low and shelving, with many large banana plantations and native houses on it;

fringe-reefs run out into the bay to the distance of about 200 yards, but there is anchorage to be found all over the bay to the distance of three-quarters of a mile from the shore in from 9 to 10 fathoms.

Junior Mission-house Point is the north-eastern point of the Kabakadaie, and is distinguished by the New Britain Mission-house, which is built on it. This point on the bay side falls abruptly to the beach in cliffs of about 40 feet drop. On the north-western side it is more shelving, but has moderately steep hills at the back. The point has a considerable fringe-reef lying from it about a quarter of a mile, inside of which there is a boat-passage. Kabakadaie is a long straight piece of coast, running in a west-south-westerly direction from Junior Mission-house Point to Shoal Point. It is fringed by a reef the whole distance; bottom, shoaling gradually from 20 to 6 fathoms, may be got from three-quarters to half a mile off the reef. The hills are well cultivated, and the shore thickly populated and lined with coco-nut trees. Fresh water may be obtained here. Shoal Point, the westernmost point of Kabakadaie, is formed by a low hill, with white sandy beach and a reef that runs about a mile to sea, terminating in shallow and dangerous water.

Luin Bay is formed by Shoal Point on the eastern and Luin district on the western side. It forms a fair anchorage for small vessels. Luin district and Cape Luin are formed by high land. From Luin Bay to Cape Luin the shore is fringed, at first, by a small fringe-reef, which gradually increases until, off Cape Luin, it extends to a very dangerous reef reaching about one mile and a half from the shore in a north and westerly direction. There are also three smaller shoals to the northward of the large reef, the outer one at a distance of about a mile and a half.

Man Island is a large island about six miles east and west by three north and south, lying about 6½ miles to the northward of Kabakadaie. It is formed by two hills, rising in the centre to about 700 feet. There are two small fringe-reefs on the south-eastern and on the south-western point, otherwise it is steep-to all round. There is no anchorage off it. The hills are thickly wooded, but there are patches of cleared land for cultivation in many places. The natives on Man Island are apt to be troublesome. Midway Shoal is a very dangerous reef, lying almost in mid-channel between Shoal Point and Man Island; it is awash at low water, one stone showing. A sharp look-out should be kept from the mast-head for this shoal in making the passage from Cape Stephens to Port Webber, the most advisable route being to keep Man Island close aboard on the starboard hand (say a mile and a half) until clear of it; then steer for Cape Luin; this will take a vessel clear of Midway Shoal. Urara Island with its reefs is an island about one mile east and west, lying to the north-westward of Cape Luin about three miles. It is low and wooded, thickly inhabited, and is surrounded by a fringe-reef on the north, south, and eastern sides, which extends from the beach about half a mile. At the western end there is a considerable reef, which extends about a mile and a half in a westerly direction, on which is a sandbank, dry at high water. To the north-westward of Urara lies a large detached reef extending to the northward about 1¾ mile. In the passage between this reef and Urara Island is a sunken reef, with 1½ fathom at low water.

Port Webber is a large embayment about six miles deep, formed by the Luin district on the eastern side and Byning district to the westward; at its head is the district called Cambira. Mount Beautemps Beaupré forms a good mark for a vessel entering Port Webber, and, if steered for, will take her clear of the slight fringe-reefs that edge the coast on the Luin side. In the eastern arm of the bay, good anchorage will be obtained at a distance of about half a mile from the shore at a depth of about 13 fathoms. A vessel should not go into a depth of less than about six fathoms, as the water after this shoals very quickly on this part of the coast. This forms a good harbour, and is very convenient for watering. The Luin district on the Port Webber side is hilly and broken; in many places the hills are bare and grassy, in others thickly wooded. The coast has large groves of coco-nut trees along the beach, and the bay is quite clear of reefs.

The Cambira district forms a tract of low land towards the beach, but further inland it rises in undulating grassy hills, for the most part crowned with groves of coco-nut trees. In the distance may be seen Mount Beautemps Beaupré, rising to the height of 1800 feet. The western side of Port Webber, in the Byning district, is very high and mountainous, with rugged peaks rising about 2000 feet.* Captain Bruck, of the German barque *Etienne*, examined this part of the coast for an anchorage, but reported that he found no satisfactory place.

Materbert Island lies nearly west from Urara Island, about 6½ miles distant, and is distant 13½ miles in a north-westerly direction from the anchorage in Port Webber. It is a small rocky island, a quarter of a mile in length, lying about half a mile from the mainland. There is a small reef projecting from the eastern end, also a somewhat larger one on the western point, which trends towards the main shore, but leaving a deep water passage between it and the mainland, which is again divided by a small shoal. The mainland is low, with white sandy beach, which forms a small bay opposite the island, where there is a river of very good water, convenient for watering. The best anchorage lies between the island and the mainland, in about 16 fathoms mud; this is as far to the westward along the shore as it is advisable that a large vessel should go, and even small vessels should be very careful in proceeding further, on account of the numerous reefs and shoals, and strong currents.

The little that is known of the northern coast of New Britain is due to D'Entrecasteaux. Indeed, it was the scene of the last of his labours before he died. It is stated in the Admiralty sailing directions that the coast between Cape Lambert and Cape Stephens has not yet been examined.

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* 1640 feet on the Admiralty Chart.—Ed.

After leaving Materbert the coast-line trends in a north-westerly direction, two indentations occurring before coming to Byning Bay, having passed on the way Matukanaputa Island, a small rocky island about 60 feet in height, with many coco-nut trees on it, and a considerable number of native houses. It has a long reef extending about one mile and a half to the south-east. A small reef a quarter of a mile in extent lies on the western side of the island. To the northward and westward lie several reefs, and the navigation is very dangerous. Byning Bay is a deep indentation in the coast, having a reef on its eastern side, between which and the shore is good anchorage for a small vessel, but the main body of the bay is deep and steep-to; several small islands lie on the eastern side of the entrance. The coast still trends to the north-west, and the shore is low and shelving, but high and mountainous at the back; numerous reefs and shoal patches lie all along it, making navigation extremely difficult. Further on a sandbank rises, with reefs on all sides. At a distance of about six miles to the northward of Cape Lambert lie the Scilly Islands, six in number, the largest having two mounds on it about 60 feet in height. They are well wooded.

Cape Lambert is bold and steep; about 12 miles to the north-westward of it lie a long chain of reefs, running in a southerly direction, Wreck Reef being the most northerly one we examined; but the natives report them to extend round outside the Scilly Isles, and to join the reefs to the eastward off the island of Matukanaputa. It would be impossible to give a description of the numberless reefs and shoals lying off this portion of the west coast, but the chart will give the principal ones. I shall therefore not attempt it; confining myself to the general warning; but the utmost caution is necessary.

Open Bay is a fine open bay, about 15½ miles wide across its entrance. Sandy Point is a low, white, sandy projection, with a shelving coast, off which the water is shallow to a considerable distance. After rounding Sandy Point the coast trends slightly north of east, having a small island (Turtle Island) off it, about 3½ miles from Sandy Point. The island has several reefs around it, the longest of which trends to the southward. Deep water was found immediately after rounding Sandy Point; Port Powell is a small harbour lying five miles due east; it has an entrance of about a quarter of a mile wide, and then extends inside to a width of about 1 mile by 1¾ mile in depth, having an even bottom of 15 fathoms (mud). All over it is well sheltered, and fresh water can be obtained at a short distance from the shore on the eastern side. It would make a capital refitting place for smallish vessels. The coast of Open Bay trends south by east from Port Powell about three miles, when it draws further to the eastward, forming the eastern extremity of Open Bay. On the south the coast is broken into smaller bays, fringed by reefs, the shores of which are very deep and steep-to, forming bad harbours. Hixon Bay is a large open bay which we did not examine, and we ascertained that the Ledanseur Island of the charts does not exist, its deceptive appearance as an island being caused by the mountain called the "North Son," being separated from the "Father" by a tract of low-lying land invisible from the offing. Heath Island lies close to Cape Deschamp, and is high, about 200 feet, and steep-to all round. Cape Deschamp is steep-to with high cliffs. Long Point is a long low point of land immediately below the Father Mountain. Low Point is a similar point immediately below the South Son.

Duportail Island lies about 4½ miles due west from Long Point. It is 5 miles long by 2¾ wide; has two mountains, one a conical peak, and the other a volcano with a very peculiar crater, of which I made a drawing. Two small islands lie from three to four miles to the westward of it, both rising like rocks from the water. Between Anne Island and Duportail lies a dangerous narrow reef, one fathom below water, and is merely a ridge of coral, so narrow that it might easily escape notice. Close Island is a small island lying close to Duportail Island on the south.

Of the "Father and Sons" Mountains, the "Father" and "South Son" are active volcanoes, the Father being the most active of the two. It throws up great volumes of smoke and a substance that, viewed from the foot of the mountain, looks like mud, though it may be ashes. The present crater has so evidently grown out of the ruins of an older one, that I am inclined to think it must be formed of more than merely volcanic ashes, though I do not think it can be lava. The "South Son" does not eject such a volume of smoke, neither is there any solid substance thrown up with it, though there is the same appearance of a new and an old crater. Both these mountains are well wooded up to the old craters, but the slopes of the new craters are quite destitute of vegetation. The "Father" is about 4000 feet high, and the "South Son" about 3000 feet; the "North Son" is much lower than either of the others, being only 1300 feet, and to all appearance it is an extinct volcano; its crater, however, has all the appearance of having been very much shattered at some former time by a very severe eruption. The natives here brought off great lumps of grey obsidian.

Mount Duportail is an active volcano, the crater having a very peculiar appearance, very much resembling the mouth of a huge whale, as if the mountain had fallen in half at the summit. It does not emit much smoke, except after rain, when there is a much larger volume. It is well clothed with vegetation on all sides of the crater, but is quite bare between the two summits.

All these islands are thickly inhabited, and the men have more intelligent faces than those of the inhabitants of the north; they also wear waistcloths, and their ornaments are of a very superior make to those worn elsewhere on the island of New Britain. The natives of Open Bay were very friendly towards us at one place called Watto. They appeared distinctly to remember having seen my vessel before, in company with one that they expressed as "puffing and shrieking." Their imitation was so graphic that I at once concluded that they meant Mr. Brown's steam-launch, which had accompanied me on my tour to Spacious Bay, which lies immediately on the other side of the island. This bay I afterwards found, on plotting my chart, to be separated from Open Bay only by a narrow isthmus of four miles in breadth, the isthmus for the greater part being plain-land, but interspersed here and there with high volcanic upheavals.

From Low Point the coast-line trends in a general direction to the south-west. This part of the coast we did not examine, except Hummock Head, which is formed by two small hillocks with a slight embayment to the southward. Chard Island is about 4¾ miles in length, lying nearly east and west. It has two low hills, the highest and most easterly being about 100 feet high. Vessy Island is low-lying and well wooded, having but one small hillock at the western end. MacDonald Island is a small island lying about four miles west of Vessy Island. These islands all appear to lie pretty close to the coast, which after leaving Hummock Head is very low and shelving.

Commodore Bay is apparently full of shoals and reefs, though it was not examined with sufficient accuracy to determine the extent of the dangers. In Commodore Bay lies Norton Island, a small rocky islet about 1½ mile from the nearest point of the coast. Cape Hoskins is a bold cliffy point, having high mountains at the back, but with a long dangerous reef running three miles in an easterly direction.

North-east from Cape Hoskins, 10 miles off, lies Fairway Reef, which is about three miles long, lying in a general direction of north-east and south-west; having two sandbanks, the most easterly of which is dry at high water, the other being awash at the same time. About west by north from Fairway Reef lies Jenkins Island, six miles distant. It is about three miles in length, having a slight rise in the centre. From each extremity of the island there extend two considerable reefs, about three miles in length. Jenkins Island is distant from Island Point three miles; between them the water appears exceedingly discoloured and dangerous.

On the mainland, about six miles south-west from Island Point, stands Mount Pyramid. It is about 2000 feet high, and received the name it bears on account of its remarkable shape, which is exactly that of a pyramid. In fact, it would be difficult to imagine that such a perfect pyramid could have been formed without human agency.

Further along the coast of the mainland we come to "Two-peak Mountain," which is about 2000 feet high, and is so called from its having two distinct summits. Point Macullock lies immediately below it, and is fringed by a very long reef, about six miles in extent, running in a north-east direction. Deception Point is a long low point, lying three miles north-west of Two-peak Mountain; it is thickly wooded down to the water's edge. Du Faure Island is a large high island, seven miles in length, lying west-by-north and east-by-south. On it are two mountains, each about 1000 feet high. Cape Wilson is a long low point, thickly wooded down to the water. It lies in lat. 5° 7′ S., long. 150° 2′ 30″ E. This is the last and most easterly point on the mainland examined by us.

Gicquel Island, Raoul Island, High Island, and Willaumez Island are all high mountainous islands. All of them appear to be formed of volcanoes now extinct; Willaumez Island being 18½ miles long. Cape Campell is the extreme north-east point of Willaumez Island, being a high cliff, and steep-to. Rock Islands are two small rocky islets, lying just south of Cape Campell. The passages between all these islands appear to be very dangerous and full of reefs. Fitz Island is of small extent, and lies south-east 17 miles from Cape Campell; it has two hummocks, about 100 feet high, and on the northern coast lie two remarkable looking rocks.

The natives of these parts of the coast were, after much persuasion, beguiled into friendly intercourse, and it was very evident that they had had no previous intercourse with white men. They appear to be a fairly intelligent race, though exceedingly timid. I bought a large number of ornaments from them, which proved to be of very fair workmanship, though they are not so good as those of the natives further to the eastward.

GEOGRAPHICAL NOTES.

Progress of Mr. Stanley's Expedition on the Congo.—Mr. A. Cohen, our Consul at Loanda, made a visit to the trading stations on the Lower Congo, towards the end of September last, and reached Vivi (or M'vivi) the permanent station established by Mr. Stanley at the foot of the Yellala Falls. He gives a similar account of the position of the settlement—on an elevated plateau overlooking the river—to that of Commander Sidney Smith.* The appearance of the place, he says, is now that of a small town; it contains, besides the residence of Mr. Stanley, dwelling-houses for his European staff, workshops, warehouses, and huts for his labourers, and a garden producing vegetables of almost every description. From the river's edge to a distance of about 30 miles, upwards along the hilly banks of the Congo, where he has established his second depôt, a road, about 12 feet wide, has been constructed, serviceable for carts and waggons, which latter together with twenty donkeys have recently arrived from Europe, to be employed in the transport of stores and supplies. In addition to the Zanzibar people brought round to the Congo by Mr. Stanley, he has obtained the services of a large number of natives from the Lower Congo, and has with him in the interior about 125; while at Vivi, which is under the charge of his agent, Mr. Sparhawk, the labourers are all from Kabenda under agreement to serve for a fixed period, it having been found that the tribes in that part of the country are not to be relied upon for regular work. Mr. Cohen further reports that there is now a very large trade on the Lower Congo, carried on by various firms—the Dutch "Africansche Handel Vereeningen," one French, one English, and two Portuguese houses—all having their principal depôts at Banana Creek, at the mouth of the river, which is the chief port, and where between thirty and forty steam and sailing vessels call annually for cargoes. Mr. Cohen ascended the river as far as Noki, 12 miles below Vivi, the highest point at which traders are established, in H.M.S. *Firefly*, the first man-of-war or vessel of her size and draught that had ascended so far, and he remarks that there is not the least difficulty for a vessel drawing 18 feet of water reaching that station, in any season; the current and whirlpools so much spoken of proving no impediment whatever. At present, communication between Noki and Vivi is by canoe, but from observations made by Lieutenant Law, commander of the *Firefly*, it was thought that vessels might ascend as far as the latter place.—From the progress which Mr. Stanley has made so far, Mr. Cohen thinks there is reason to believe that he will carry out the great work he has undertaken, and that through his indomitable perseverance and energy the Congo will eventually become the high road from Western to Central Africa.—A similar account of Mr. Stanley's progress has been given by Père Schmitt of the Loango Mission, who writes from M'boma on the 31st of October. The traveller was then three days' march above Vivi. He had received an accession to his party in the shape of four Belgian officers, but one of them returned after remaining only a few days with him.

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* *Ante*, vol. ii. p. 183.

M. de Brazza's Expedition on the Ogowé.—M. Savorgnan de Brazza is reported to have founded the first station of the French branch of the International African Association at Nghimi, in the region of the sources of the Ogowé, on the road from Mashogo to Levumbo, and near the watershed between the Ogowé and Congo basins. Its position is marked on M. de Brazza's map * of the upper courses of the Ogowé, Alima, and Licona, in about 1° 30′ S. lat., 13° 35′ E. long., not far from the right bank of the Passa affluent of the Ogowé. The place chosen is at a sufficient altitude, and the climate is said to be healthy. M. Mizon, who is to be in charge of the station, will shortly proceed to his post, in company with

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* See Bulletin of the Geographical Society of Paris for February 1879.

Dr. Ballay, who will afterwards join M. de Brazza in an expedition further into the interior.

Arthington Falls of the River Brije, or Ambriz, West Africa.—From a letter, addressed by Mr. Hartland to the Baptist Missionary Society, we obtain fuller particulars of the visit paid by Mr. Comber and himself to the magnificent waterfall in Zombo, to which, as mentioned in our last number,* the discoverers gave the name of Arthington Falls. The road from Ma'anti to Mbangu, Mr. Hartland says, is one of the worst they have yet seen,—a continued succession of hills, up and down which they wearily trudged for hours; the valleys that divide the heights forming deep, muddy marshes, overgrown with reeds, rank grass, and papyrus. In two places they were obliged to wade through these broad swamps, and in another part about 150 yards of marshy ground had to be crossed by climbing from branch to branch and tree to tree. After a night spent at Banza Zulu, a small town at the foot of the Zombo Hills, they climbed the steep path up the hill some 500 feet above the plain. The view would have been splendid, but unfortunately thick clouds rested upon the hills, hiding everything beyond a few feet of the path. They remained but a short time at Banza Mbangu, and were then summoned to Congo di Mbangu, where the chief of the district received them in great state, and invited them to stay a day or two in his town. As they were tired and footsore, and wanted to see the grand waterfall, they readily consented; and when the mist-wreaths had been swept away by the westerly breeze, and the sun was shining gloriously, they went to the falls. After about half an hour's walk through the woods, and down a path which Mr. Hartland describes as suited rather for cats and monkeys than for men, the road suddenly turned, and the fall, the roar of which they had heard for some time, burst upon them in all its grandeur and beauty. Messrs. Comber and Hartland were standing on a steep hill opposite, at a distance of about 500 yards, and from this position beheld "the grand stream of foaming water rolling majestically down between two tree-clad, stately cliffs, first leaping with one grand perpendicular plunge of 150 feet, and then tumbling, foaming, and roaring down the remaining part of its steep, rapid descent, until it reached the plain below, having fallen about 450 feet almost perpendicularly." As will be seen by the map,† the river Brije had to be crossed twice by the party at the foot of the hill, and it is there some twelve to eighteen yards broad, with a clear stream flowing rapidly in a clean pebble bed. This was in the middle of the dry season, but during the rains the river overflows its banks and assumes much larger proportions.

Re-interment of the Remains of Lieutenant John Irving, R.N.—The remains of Lieutenant Irving, of H.M.S. *Terror*, recovered by Lieutenant Schwatka on his recent expedition to King William Land in search of relics of Sir John Franklin's Expedition, were re-interred, with naval honours, and amid manifestations of great popular interest, at Edinburgh on the 7th of January. The funeral *cortége*, which passed through several of the principal streets on its way to the Dean Cemetery, was headed by a firing party of eighty-six marines from the *Lord Warden*, with arms reversed, followed by the band of the 71st Regiment, playing funeral marches, the coffin, borne on a gun-carriage drawn by six horses, and a long procession of mourners, which included a large number of seamen marching five abreast, and detachments from various cavalry and infantry regiments. The chief mourners were Major-General Irving, R.A., C.B., brother of the deceased, and Captain Lindesay Brine, R.N., who represented the Royal Geographical Society at the request of the President.* Sir Alexander Grant, Bart., Principal, and others, represented the University of Edinburgh; Professor Geikie and other men of science, the Royal and Geological Societies, and Admirals Dunlop and Fellowes, Commander Johnson, H.M.S. *Netley*, and a number of other officers, represented the Royal Navy. Among the numerous military officers present was Major-General Hope, C.B., Commanding the Forces in Scotland. The Lord Provost of Edinburgh followed in the procession. The remains were enclosed in an oak coffin, and the inscription on the plate was "John Irving, Lieutenant R.N., born 1815, died 1848–9."

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* *Ante*, p. 22.

† *Ante*, p. 64.

Irrigation Works on the Lower Jaxartes.—The 'Turkistan Gazette' publishes some particulars with regard to the efforts which have been made by the Russians in the Kazalinsk district, to improve the condition of the once populous country on the banks of the Syr-Daria or Jaxartes, which was turned into a desert by the Mongol invasion of the middle ages. The Kazalinsk district having been rendered exceedingly unproductive by the destruction of the irrigation canals, an endeavour has been made to repair them, and five have already been cleared and made serviceable. The Ber-Kazandy which issues from the left bank of the Syr-Daria, 30 miles from Kazalinsk, was formerly some 39 feet broad, but is now reduced to 33 feet; it is 7½ miles long, and fills the Ber-Kazandy lakes, from which the low-lying plains are irrigated. The work of clearing this canal was commenced in 1876, and in 1879 a very large amount of grain was sown in the region which it fertilises. The Bau-Jidy, again, used to be 7 miles long and 21 feet broad, but it was so filled up that scarcely any traces of it could be found. The Kara-Aryk, or Black Canal, of about the same length, was put in order in 1878, and with the last-named waters a considerable tract of productive land. The Ergherek canal, which leads from the Syr-Daria to the plain of Ergherek, is less than 7 miles long in a straight line, but is in reality much longer owing to its numerous windings; it was originally from 22 feet to 33 feet in width, and on reaching the plain of Ergherek it is divided into three canals, each belonging to the Kirghiz tribe, which helped to repair it. On this work 4000 men were employed for eleven days in 1878, and half that number for eight days in the following year. The plain was brought under partial cultivation in 1879, and last year this state of matters was further improved. The Jany-Aryk, or New Canal, which is not yet completed, passes near the ruins of Jankend, and will be 20 miles long, with a breadth of about 20 feet, watering a productive region. These public works in Central Asia are carried out in the spring, after the crops have been sown, or else in the autumn on the return of the nomad Kirghiz, after their summer wanderings and when the rains have moistened the surface of the country. The time occupied never exceeds two months, but to make up for that, all the available hands of the country are employed on them, and in accordance with ancient custom, even the people of the tribes around are called in to help, working with their own tools and living at their own cost. It is by such means as these that it becomes possible to execute these great irrigation works, the extent of which excites the admiration of every visitor to Central Asia.

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* *Vide infra*, p. 110.

Von Mollendorf's Travels in North-east China.—Herr von Mollendorf, in giving an account recently to the Berlin Geographical Society of his travels in the autumn of 1877 through that portion of the Pechili province which lies north of the Great Wall, remarks that the extra-mural districts of Shansi and Pechili were reckoned by the Jesuit fathers as part of Tartary, and are now considered by many modern geographers as belonging to South-eastern Mongolia; whereas on political, geographical, and ethnographical grounds they should be treated as part of China. The physical boundary between the nomad inhabitants of the steppe and the Chinese agriculturists is here distinctly coincident with the edge of the Gobi plateau and the line of the Hsingan Mountains. The tracts referred to were cultivated by Chinese long before the Mongols appeared in the history of China. In the course of the border wars before and after the Ming dynasty, these settlements suffered serious ravages, and a great portion of the cultivated country was laid waste. When the present Manchu dynasty took possession of it in the seventeenth century, the northern district, which was still wild and forest-covered, was set apart as an imperial hunting-ground (Weichang), and all settlements therein were interdicted, while the south could boast of a settled population. About the middle of the eighteenth century, the southern portion, which was already studded with towns and villages, was created a prefecture under the civil administration of the province of Pechili, while the northern was placed under military government. During the present century, these great hunting-grounds have been gradually diminished by the frequent concessions of land to settlers, though large tracts are still reserved as of old. Herr von Mollendorf's journey in 1877 was from Peking north-east to the Gu-bei-kow or Ku-pe-kow gate, whence he proceeded northwards across a mountainous country with well-cultivated valleys, crossed the Lan-ho, and arrived at Huang-ku-tun (Boro-hotun, Boro-tcheng) in the valley of the Issun

(Yisun), the most important tributary of the Lan-ho. Although partly cultivated, this country contrasts strongly with the older cultivated portion, the mountains being still clothed with forest growth, while the settlements consist of scattered farms instead of fenced villages. A portion of the reserved hunting-ground was visited, and proved to be remarkably rich in wild game. A thick undergrowth of artemisia and wild asparagus, interspersed with forest trees, occupied the tract; while pheasants, partridges, grouse, quails, water-fowl, deer, hares, foxes, and wolves were all met with. The traveller collected some information regarding the great Petcha Mountain mentioned by the Jesuit fathers, the reputed height of which (12,000 to 15,000 feet) Dr. Fritsche not only denied, but even doubted the existence of such a mountain at all. The Chinese inhabitants speak of a mountain called Baitcha (a fact which is corroborated by references thereto in their literature), and they describe it as the highest peak or peaks of the watershed from which the tributaries of the Lan-ho, the Issun (Yisun), and Imatu (Yimatu) flow southward, the head-waters of the Sira-muren or Liau north and north-east, and the Lohan eastward. The height ascribed to it by the Jesuits may possibly be rather above the mark, but Herr von Mollendorf thinks that it must be at least between 9000 and 10,000 feet in height. From Huang-kutun the travellers proceeded westward past the town of Ta-korh and the Upper Shang-tu into the western hunting-grounds, in the narrow rocky valleys of which there is a rich forest growth and abundance of game, among which may be mentioned the north China antelope (*A. caudata*) and the eared pheasant (*Crossoptilon auritum*). On the whole, the fauna and flora of this alpine region approximate closely to the Eastern Siberian types. The return journey of the party led them across the Upper Pai-ho, near the place where it passes the Great Wall, and so into the plain of Peking, near the celebrated tombs of the Ming dynasty.

Exploration of the East Coast of the Gulf of Carpentaria.—From Captain C. Pennefather's official report we gather the following particulars respecting his exploration of the Coen, Archer, and Batavia rivers, Gulf of Carpentaria, in the Queensland Government schooner *Pearl*. Captain Pennefather sailed from Thursday Island on June 28th, 1880, and made the land in 12° S. lat., where the coast appeared barren and sandy, though inland the country was thickly timbered. Proceeding southwards, he anchored off the supposed mouth of the Coen River in 12° 13′ S. lat., and being unable to take the *Pearl* in, he started in the whale-boat to examine the river. Half a mile from the mouth the inlet opened out into a basin three-quarters of a mile wide; natives were very numerous and friendly, though they appeared to have never seen any white men before. Captain Pennefather went six miles up the river, when his progress was stopped by mud banks and mangroves, and he could find no appearance of a river, but only small creeks; the country at the back of the mangroves appeared to be open forest, but it was not possible to land and examine it, as the soft mud extended so far out. Captain Pennefather next anchored off the mouth of the Archer River (13° 21′ 30″ S. lat.), between which and the Coen the coast was low, except at Pera Head and Duyfhen Point, where red cliffs were seen. For the first six miles the Archer River was found to be two miles wide, with an island in the middle; it then branches off into several creeks to the south, the main channel running east. An open and well-grassed plain extends for some miles from the right-hand bank, and beyond open forest country was seen. Game of all descriptions was very plentiful, and alligators were also common. Captain Pennefather proceeded four miles further up, the river still running in an easterly direction, and with a breadth of between 400 and 500 yards; the banks were in some places fringed by a belt of mangroves, and in others were clear to the water's edge, with plains extending to open forest country. Hitherto the party had not seen any natives, but the numerous puffs of smoke observed during the ascent of the river were evidently produced by signal-fires giving notice of their approach. Favoured by the shadows cast on the water by the tall trees on one side of the river, the natives attacked the boat when at anchor in the night, but were beaten off without difficulty. The next day the party proceeded up the river, and found an improvement in the country; there were no longer mangroves growing on the banks, and in their place were rich tropical-looking shrubs, behind which was open forest country; the timber principally bloodwood and stringy-bark, with a few box-trees. The banks there were generally high and the river still wide (400 yards), with deep water from bank to bank. Having ascended the river for 15 miles, and seeing no appearance of any change in the country, Captain Pennefather returned to the *Pearl*. Steering northward, he intended to have examined the apparently good country about Duyfhen Point, but the wind was unfavourable, and he next anchored off the mouth of the Batavia River, in 11° 51′ S. lat., 141° 53′ E. long. A deep channel having been found, the *Pearl* was anchored three miles up the river, where it was five miles broad, and a party which landed on the south bank for firewood, found the numerous natives very friendly, though they appeared to have had no communication with white men before. Their ordinary canoes are made of bark, but, besides, they have large outrigger canoes, cut out of trees. Accompanied by Mr. Campbell, Captain Pennefather proceeded up the river, which for the first six miles maintained a width of between four and five miles, with an average depth of 30 feet; on the right-hand side the banks are high, with fresh-water springs, and the country open, with abundance of grass and timber. At the end of six miles the river branches to the south and to the south-east, and on examination the former stream was found to be the main river. Several miles up this branch, Captain Pennefather landed on the right-hand side, and found the banks high, with open forest country, well-grassed and timbered, the bloodwood and stringy-bark being very lofty and straight; the soil (loam) appeared good. While trying to stalk a crocodile basking on a bank of the river, Captain Pennefather suddenly saw a mob of blacks in the long grass, armed with spears, and evidently stalking him. He accordingly retreated slowly to his camping place, followed by the blacks; but on Mr. Campbell and the rest of the men coming up, the blacks halted, and after a time five of them came forward. These men are stated to be of a different type from those at the mouth of the river, being "big, tall, strapping fellows of a copper colour," and appearing to talk a different language. The party afterwards went further up the river, and found the banks becoming higher, and clothed with rich tropical scrub, amongst which grew some extremely lofty and perfectly straight timber. The soil in the scrub was very rich, and well irrigated by small running streams; handsome palms were growing at the edge of the water, which was fresh and sweet. The river now took an easterly direction for three or four miles, becoming wider in places, with islands in the centre; again, it turned to the south-east, with shoal water in the broad reaches, but deepening as the channel became more defined. In all, Captain Pennefather explored the Batavia River for a distance of 36 miles, and he considers that it is, on the whole, a fine stream; he further thinks that if this part of the country be opened up, the mouth would make a splendid port, in which vessels would lie in smooth water, while they could easily ascend the river for a distance of 25 miles. His report is accompanied by a plan (one inch to the mile) of the river, on which is noted the nature of the surrounding country.

St. Ambrose and St. Felix Islands.—These two small islands, situated in the South Pacific off the coast of Chili and north of Juan Fernandez, have been proved by deep-sea soundings recently taken by the *Alert*, to be true oceanic islands, i. e. without submarine connection with South America. The soundings were taken midway between the islands and the continent, and gave a depth of 2250 fathoms, with bottom temperature of 33°·5 (Fahr.); in temperature and depth thus corresponding with the general bed of the South Pacific. Other soundings between the two islands and Juan Fernandez gave a depth of 2000 fathoms. These several scattered islands thus appear to rise from a submarine plateau as isolated mountains. St. Ambrose rises 1500 feet above the sea-level, and is composed entirely of volcanic scoria arranged in well-marked horizontal strata, intersected by vertical dykes of basalt, which have the appearance of streams flowing from the summit when viewed at some distance. Vegetation is scanty, and the island is without water; though frequented by sea-birds, the sides are too steep and rugged for guano to collect. There is no anchorage off the island, 20 or 30 fathoms being obtained at less than a cable's length from the shore.*

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* Hydrographic Notice, No. 23, 1 August, 1880, published by the Admiralty.

The Basin of the Upper Orinoco. — In a recent Bulletin of the Geographical Society of Paris, M. Frédéric Montolieu gives some account of his exploration of the Ynirida, an affluent of the Guaviare tributary of the Orinoco, of which previously scarcely anything was known. The object of his visit was not only to study the topography of the river-basin and its inhabitants, but especially to seek for a route for Brazilian traders in the rainy season from the Upper Guainia (or Rio Negro) to the Ynirida, whither they go to purchase sarsaparilla.—He says the course of the Ynirida may be divided into two distinct parts. From its confluence with the Guaviare to the Mariapiri rapid or cataract, it has a current of from three to four miles an hour, and many terrible rapids (*raudales*) interrupt the navigation. From Mariapiri to Guacamayo—the last Indian village which M. Montolieu was able to visit—about 45 miles below the source, the Ynirida becomes a lake, almost without current and rapids; numerous lagoons surround it, and only two unimportant hills, named Bachaco and Mapuei, were seen. The valley of the lower course, on the other hand, is enclosed between several granitic mountain chains, of which the chief are those of Mariapiri, Kubalé, and Mavécuri. In the rainy season many rapids disappear, but from November to February navigation is only possible between the rapids. The water of the river appears black, but in reality has only a slight ferruginous tinge. The cayman, which is so common in the muddy and yellowish waters of the Guaviare and Orinoco, is not seen in the Ynirida, but enormous anacondas and numerous otters are found instead.—The Ynirida descends from its source almost parallel with the Guainia (the Upper Rio Negro) as far as Kubalé (i. e. from west to east), and it then runs to the north-east, forming an acute angle with the Atabapo, which runs from south to north; it falls into the Guaviare at a point 15 miles from San Fernando de Atabapo (4° 2′ 48″ N. lat., 68° 10′ 46″ W. long.).—The population appears to be sparse between the mouth of the river and the Kubalé rapid (69° 5′ W. long., the meridian given by Codazzi as the frontier between Venezuela and New Grenada, but disputed by the former). Above Kubalé the Indian villages increase in number, and the series of rapids separates them from civilisation. The principal products are mandiocca or cassava, caraña resin (*Isica caraña*), and the bark of the sapucaya nut-tree (*Lecythis sp.*); but the great wealth of the Ynirida region lies in the *zarzalés*, or places where sarsaparilla grows. On the river banks also grow the chiquichique palms (*Attalœa funifera* Marl.), which yield the *piassaba*, so valuable for making cables, from its not being damaged by water. M. Montolieu, in conclusion, furnishes some notes on the Puniabo Indians and their manners and customs, as well as the natural history of the region, &c. His paper is illustrated by a map, which in its general features is based on those of Reguena (1777) and Codazzi (1848), the course of the Ynirida being laid down from compass bearings taken during his journey.

Position of the City of Mexico.—The *Boletin* of the Geographical and Statistical Society of Mexico for last year contains an elaborate detailed statement of the observations made by the engineer Senhor Francisco Jimenez and Professor Leandro Fernandez, at the Observatory, to determine the true geographical position of the city of Mexico. The following is the result of these observations:—Latitude 19° 26′ 1″·3 north, longitude 6 hours 36′ 26″·67 (or 99° 6′ 39″·15) west of Greenwich. The height above sea-level was ascertained to be 2283 metres, or 7490 feet.

Admiral Ryder's amended Proposal respecting Prize Medals to Naval Officers and others in Encouragement of Surveys, and Suggestion of an International Congress of Hydrographers.

In June last Admiral A. P. Ryder submitted to the Council the following modified proposal with regard to the institution of medals for the reward of naval officers and others who may make useful surveys:—

ADMIRALTY HOUSE, PORTSMOUTH, *May* 1880.

SIR,—I thank you for your communication (since printed with my letter in the Society's 'Proceedings' for April *), in which you inform me that my offer of 100*l.* to found "Bird Allen" medals was declined. I have carefully considered the grounds of refusal. My proposal was to confine the medals to officers of the Royal Navy and Marines; and the Council, I can easily understand, thought, as they state in the concluding paragraph, that "the Royal Naval College at Greenwich, or some similar institution connected with the Admiralty, would be better able to carry out such a system of honorary rewards" to be bestowed on naval officers only. I concur in the views of the Council, and have therefore altered my proposal. I wish now to throw the reward open to nautical geographers generally. I am confident that the Council of the Royal Geographical Society will experience no difficulty in finding efficient judges of nautical surveys who, for the love of science, and in the cause of humanity, so much benefited by correct charts, will be willing once a year to award the prizes. I am certain also that the Hydrographer will, with the consent of the Lords of the Admiralty and their approval, be willing to give advice with regard to the details of my proposal, and that he will gladly aid this attempt to encourage those who may endeavour to further the interests of hydrography. I have long been of opinion that inability to make a nautical survey of a harbour, a shoal, or a coast-line, is a great drawback to a sailor's usefulness, whether he belong to the Royal Navy or the merchant service. I therefore have the honour to request that you will submit the following proposal to the consideration of the President and Council of the Royal Geographical Society. The proposal is that the Council of the Royal Geographical Society accept from me the cost of offering one gold, one silver, and one bronze medal every year to nautical geographers, including officers of the Royal Navy, of the Royal Marines, and of the mercantile marine, who shall have submitted to the Council the three † most deserving surveys made and projected by themselves, with the necessary sailing-directions, meridian distances, and meteorological observations, &c. There will be no possibility of this medal being mistaken for that highly honourable distinction the Royal Geographical Society's Gold Medal, although a few of the recipients of the former may hope some day to aspire to deserving the latter also. It will be distinctly understood that if the charts be engraved and published by the Royal Geographical Society, no responsibility whatever, as to the accuracy of the information, is taken by the Society, and that this be stated *distinctly* and *conspicuously on each chart*, which chart should be withdrawn from circulation immediately after the issue of an Admiralty survey. It may fairly be anticipated that the Royal Geographical Society, if it adopts this suggestion, will, by so doing, give a considerable impulse to the acquirement by nautical geographers (civilians and naval officers) of a knowledge of nautical surveying, and that after a little time the true geographic spirit will be much more widely awakened generally, and especially in the Royal Navy, than at present. The race of naval men who have done so much for geography, independently of their service in the Royal Navy—Clapperton and Tuckey, Lyon and Cameron, Cochrane and Smyth, Franklin and Parry, Julian Baker and Musters, and a host of others—will henceforth be more easily continued and replenished by volunteers. At the same time officers of the mercantile marine will more generally emulate the examples of Horsburgh, Allen Young, Toynbee, and other master mariners, who have combined surveying or scientific research with their regular work. Valuable surveys and re-surveys will reach England every year from all quarters of the world, executed by amateurs, but of course merely supplementary to the invaluable work of the regular marine surveyors. Those officers of the Royal Navy who are winners of the Greenwich prizes and Beaufort prizes, and those who obtain "First Classes" in navigation, will not be content unless they carry off also the "Bird Allen" gold medals for nautical surveys. With regard to expense, the intrinsic value of a gold medal, the size of a doubloon, is 3*l.* 15*s.*; of a silver medal, the size of a dollar, 4*s.*; of a bronze medal, the size of a dollar, 1*s.*; together, 4*l.* There would also be a small expense for engraving the name of the recipient on the rim of the medal. 100*l.* invested at 4 per cent. would meet the demand. Mr. Wyon showed me, some years since, the *die* of one of your medals, which he thought would be suitable. I shall be glad, if the Society should welcome my proposal, and adopt it (subject, of course, to such changes as to details as may be agreed on), to pay 100*l.* to the Society for the above purpose. The best *practical* marine surveyor I ever met in our service, and who instilled a love of the science into all of his young subordinate officers, was the late Commander Bird Allen, R.N., who was first lieutenant with Commander Richard Owen, in H.M.S. *Thunder*, in the West Indies, 1833-6, and died as commander of H.M.S. *Soudan*, in the Niger expedition, 1840. I should like the medals to be called the "Bird Allen Medals for Nautical Surveys." I have lately returned from being commander-in-chief in China and Japan for three years. Had a knowledge of practical marine surveying been as common as it was rare among the commanders, lieutenants, and sub-lieutenants, considerable additions might have been made to our geographical knowledge on that station, much of which requires re-surveying; much of which is unexplored, or as regards large extents of coast-line, is in that dangerous half-explored, non-surveyed state so fatal to numerous ships.

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* 'Proceedings,' vol. ii. p. 253.

† No one would be entitled to receive more than one medal of each description; but if the person who produces the best survey of the year is already a medallist he might receive from the Royal Geographical Society a certificate notifying the fact, and

ALFRED PHILLIPPS RYDER, F.R.G.S., Admiral.

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on the medal he has already received would be engraved the years in which he wins this extra distinction. The bronze medal would most frequently be won by the junior geographers.

The following letter on the subject of Hydrographical Surveys was sent at the same time as the above by Admiral Ryder.

ADMIRALTY HOUSE, PORTSMOUTH, *May* 1880.

I have visited nearly every portion of the globe, and have, by early and much prized association with the surveying service, been driven, by the fascination that surveying exerts over its votaries, to take a deep interest in the work. I have often asked myself these questions: (*a*) When will the surveys of marine dangers be completed, on such a scale and with such accuracy that nothing will be left to be desired on the part of navigators? (*b*) By what law is the rate of progression of this world-wide survey proceeding now? The result of my inquiries is that although various countries exchange their surveys, there is *no* concerted action between the Hydrographical Departments of the different countries interested in the matter, as to the *prompt distribution of the work remaining to be done.* To bring about this concerted action there should, in my opinion, be a Congress to sit in London, with access to its treasures of geography, and with, as its Presidents, the Hydrographer and the President of the Royal Geographical Society. I submit to the Council that this proposed course of action would well become the high position of the Royal Geographical Society in the scientific world, and that the result could not do otherwise than redound to its credit, and to the advantage of navigation. I do not venture to go into details, which could be best settled by a Special Committee appointed for the purpose.

ALFRED PHILLIPPS RYDER, F.R.G.S., Admiral.

The foregoing proposals having been referred to the Scientific Purposes Committee and duly considered by them, the Council, after the vacation, directed the following answer, founded on the Report of the Committee, to be sent to Admiral Ryder:—

1, SAVILE ROW, W., *November* 27*th*, 1880.

SIR,—I am directed by the Council to inform you, with regard to the renewed and amended proposal which you made to them in May last, of awarding medals to officers of the mercantile marine and the navy for nautical surveys, that, while recognising the importance of the object you desire to attain and the liberality of your offer, they have, after careful consideration, come to the conclusion, that the plan of granting medals to officers and seamen for independent nautical surveys is impracticable.—I am requested further to say, with respect to your other proposal of the same date, of a Conference having for its object the promotion of surveys by concerted action between Hydrographical Departments of different countries, that, in their opinion, the proposal hardly comes within the sphere of the Society's operations, and that they are unable therefore to take the action you desire in the matter.

H. W. BATES,
Assistant Secretary.

Obituary.

Mr. J. T. Towson.—We regret to have to record the death at Liverpool, on January 3rd, at the age of seventy-seven, of Mr. John Thomas Towson, who had been a Fellow of our Society since 1858. Our associate was born at Devonport, and first became known for the improvements he suggested in the art of photography. In 1846, however, he turned his attention to navigation, and especially to discovering the quickest routes to distant countries. His chief services were in connection with great circle sailing, for which he constructed a set of tables, and another and most valuable set of tables for the reduction of ex-meridian altitudes. These were presented to and published by the Admiralty. In 1850 Mr. Towson was appointed Board of Trade examiner, at Liverpool, of officers of the mercantile marine; and he retained that post until 1873. He was one of the first to call attention to the deviation of compasses in iron ships, and in 1863, at the request of the Board of Trade, he drew up a Manual on the subject of compass deviation, which was published under the title of 'Practical Information on the Deviation of the Compass, for the use of Masters and Mates of Iron Ships.'

General E. T. Dalton, C.S.I.—The death is announced of Major-General Edward Tuite Dalton, C.S.I., who entered the army in 1835, and took part in expeditions against the frontier tribes of Assam in 1839–40 and in 1842. When two French missionaries, MM. Kirk and Bourry, had been murdered on the Tibetan frontier by a Mishuri chief, General Dalton received much praise for his skill in organising the expedition which captured the murderer. Our associate died at Cannes, on December 30th, in the sixty-fifth year of his age.

CORRESPONDENCE.

The Keeling Islands.

BERLIN, *December* 1880.

With reference to the remarks on the Keeling Islands contained in the 'Proceedings of the Royal Geographical Society,' vol. i. p. 777, and vol. ii. p. 49, I beg permission to communicate to you the following details, partly derived from Dutch sources.

It is well known that this island group was discovered by William Keeling, at the time in the service of the English East Indian Company, in the year 1609, on his return journey from the Moluccas. In the year 1823 an English adventurer, named A. Hare, settled on the southernmost island of the Keeling group. He was accompanied by a number of Malay and Indian slaves who, according to his account, had been presented to him by certain chiefs on the occasion of his voyage to the Cape of Good Hope and the Indian Archipelago. A Dutch naval officer who visited the settlement in the year 1829, ascribed this voluntary exile of Hare upon these hitherto uninhabited islands to a peculiar whim of his, which prompted him to avoid all contact with civilised society in order that he might exercise unlimited sway over his slaves. Three years later he was joined by a Scotchman named J. Ross, born in the Shetlands, and belonging to a respectable Scotch family. The latter had navigated the seas of Greenland and the Indian Ocean, and at the time when the English were still in possession of Java, he commanded a brig. Later on we find him employed as manager of a settlement in Borneo, where also Mr. Hare occupied a post. Ross set the Javanese placed under him, and of whom the greater number were criminals, to build a three-masted vessel, which was named the *Borneo*, and which he navigated for several years under the English flag, journeying to and from Sumatra. On these occasions he touched at the Cocos Islands, and attracted by the excellent harbour which they offered, he proposed to his principals in London to make the Keeling Islands the depôt in their future pepper-trade, after buying up all the pepper in the market with the view of counteracting the growing competition of the Americans in this branch of their trade with Sumatra. The speculation, however, miscarried, the London firm failed, and Ross with his pepper-bags was left alone upon the Keeling Islands. Soon after, serious disputes arose between Ross and Hare, the latter of whom had established a perfect pachalik on these islands. The quarrel ended by Ross settling down on Direction Island, while Hare took possession of Rijst Island, called by the Malays Poelve Tocan, or Lord's Island. Hare resumed his life of seclusion, and Ross with his family transformed the islands inhabited by him into a fertile garden, and by trading in coco-nuts, which there grew in abundance, laid the foundation of his future prosperity. According to existing treaties the Keeling Islands are included in the Netherlandish possessions in the East Indies, hence we find on the official chart of Felden Hindersin the following words: "Deze eilanden, van oude Nederlandsch eigendom, zijn in 1829 mit dien hoofde weder in beziet genomen en maken das een gedeelte mit der Nederlandsche bezittingen in Oost-Indie." * Ross, whose commercial transactions chiefly brought him in contact with the Dutch, made frequent application to the Dutch Government for permission to use the Dutch flag, but after twenty years' vain endeavours he failed in obtaining the requisite sanction. When therefore, in the year 1856, an English corvette arrived at the islands, young Ross—his father had died in the meantime—could not salute the English flag by hoisting the Dutch colours. The English captain, informed of this circumstance, landed, and placed the island group under the protection of Her Britannic Majesty.

W. Koner,

Editor of the *Zeitschrift der Gesellschaft für Erdkunde.*

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Fourth Meeting, 17*th January*, 1881.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*John Adams, Esq.*; *Charles E. Atkinson, Esq.*; *J. Frederick Baness, Esq.*; *David Wellesley Bell, Esq.*; *Edmund Knowles Binns, Esq.*; *Henry Courtier, Esq.*; *Rev. Henry Jephson*; *The Maharaja of Johore*; *Major R. Kennedy*, I.A.; *Alfred John Loftus, Esq.*; *Arthur G. Reid, Esq.*, M.D.; *Carl Rosa, Esq.*; *James Poole Wagstaff, Esq.*; *Ralph Champneys Williams, Esq.*; *Major R. G. Woodthorpe*, R.E.; *John Randon Worcester, Esq.*

In opening the meeting, the President announced that, since they last met, it had been his duty to address a letter to Major-General Irving, R.A., expressing on behalf of the Society his deep sympathy with him and the other surviving relatives of Lieut. Irving, R.N., of Sir John Franklin's Expedition, and his admiration of the courage and devotion of the deceased officer, on the occasion of the re-interment at Edinburgh of his remains, which, as they were aware, had been discovered by Lieut. Schwatka in the recent American expedition to King William Land, brought to New York, and afterwards sent to his relations in Scotland. He (the President) had requested at the same time Captain Lindesay Brine, R.N., to represent the Royal Geographical Society at the funeral, which he readily consented to do.

The President then introduced the subject of the evening, which was—

"The Voyage of the *Eira*, and Mr. Leigh Smith's Arctic Discoveries in 1880." By C. R. Markham, C.B., Secretary R. G. S.

The paper, with map and illustrations, and the discussion which followed, will be published in the March number of the 'Proceedings.'

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* "These islands, for many years the property of the Netherlands, have on this account been again taken possession of in 1829, and form part of the Dutch possessions in the East Indies."

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—January 7th, 1881: M. A. Grandidier in the Chair.—A letter was read from Dr. Oscar Lenz, announcing his arrival at St. Louis on November 22nd, 1880, and giving his itinerary from Tangier to Timbuktu and thence to Medina, on the Senegal.—A communication from the Minister of Public Instruction was read, giving extracts from a letter from Dr. Crevaux who is now in Equatorial America. After explaining how he was led to change his original plan, and to direct his course towards the Upper Magdalena, Dr. Crevaux states that he has been able to construct a map of this important river from Honda to Neira, and that his companion, M. Lejanne, has taken thermometrical and hypsometrical observations, besides measuring the breadth of the river at the principal points. Dr. Crevaux further announces that he is preparing to cross the Eastern Cordillera in search of the Guyabero affluent of the Orinoco, with which even the natives are unacquainted. The Guyabero, he says, may be considered a large affluent, judging by the volume of its waters near the Andes, and it may possibly be turned to account for the carriage of cinchona, which is at present brought by land to the Magdalena. Dr. Crevaux does not think that in this region any stream will be found of more importance than the Guyabero, which may, perhaps, prove to be navigable for steamers, whereas the head affluents of the Rio Negro are often inaccessible for large boats. In conclusion, Dr. Crevaux expresses his gratification that his route will take him amongst new tribes of Indians, instead of through previously explored regions along the Amazons.—M. d'Abbadie furnished some particulars respecting M. Lucereau who had met a friend of his at Aden. That gentleman perceived that the traveller was not suited for his enterprise, and advised him to give it up; he, however, persisted, and has been murdered on the way to Shoa. Adverting to the fact that M. Lucereau travelled armed to the teeth, M. d'Abbadie took occasion to urge, as he has previously done, that it ought to be a fundamental rule with European travellers in that part of Africa to carry no arms of any description, and to his observance of this practice he attributed his having been able to travel in the same region for eleven years without any difficulty. M. Bardey furnished some additional particulars, by which it would seem probable that the death of M. Lucereau took place about the 5th of last October.—M. Dutreuil de Rhins afterwards gave some interesting information respecting the course of the Song-mâ, an almost unknown river of Thanh-hoa, in Southern Tongking, which has recently been ascended for some distance by two missionaries, one of whom died from the bush fever so much dreaded by European travellers in Indo-China. M. Dutreuil de Rhins gave a sketch of the history of this region, which has often served as the battle-field of the nations of Indo-China, and he spoke of the peoples inhabiting it, which, according to him, belong to two races only. He pointed out the importance of a complete exploration of the river, which may, perhaps, be identified with the Li-sien-kiang, considered by other geographers to be the head of the Kim-lou-ha or Black River, one of the affluents from the right bank of the Red River or river of Tongking. Dr. Harmand then made some observations on the subject of the inhabitants of this region of Indo-China, whom, in opposition to M. Dutreuil de Rhins' view, he considered to belong to several races, the distinctions between them being clearly marked in their figures, hair, the conformation of their skulls, and the colour of their skins. With regard to the criterion of language, to which M. de Rhins had alluded, Dr. Harmand pointed out that but little stress could be laid on it in these regions, where, as is the case with all races unacquainted with the art of writing, the languages are very quickly changed or replaced by those of their conquerors. Dr. Harmand remarked, besides, that the Roman Catholic missionaries could not be worse prepared than they are for this description of study, which requires special knowledge and practice, and that very little value can be attached to their observations bearing on anthropological questions, which ought, however, in these days to be looked upon as possessing very great geographical importance.

Geographical Society of Lyons.—November 18th, 1880.—In opening the meeting, the Chairman made some feeling remarks on the loss which the Society had sustained by the death of M. Mulsant, the learned entomologist. After a statement by the General Secretary of the chief geographical events since the last meeting, an account was given of the desiccation of Lake Fucino (or Celano—*Lacus Fucinus*), in the Abruzzi, a work which had been executed for Prince Torlonia, of Rome, by the French engineers, MM. de Montricher, Bermond, and Brice.

——— General Meeting, December 28th, 1880.—The President read his Report, in which, after an allusion to the number of the members of the Society, he mentioned that the course of lectures on commercial geography had realised the object for which it was instituted, and that another on physical and commercial geography would be begun on January 9th. The course of lectures on historical and military geography had met with the approval and encouragement of the authorities. He stated that the monthly meetings had increased in interest; Dr. Rodet had dealt with the subject of medical geography; Père Charmetant and the Rev. Mr. Coillard had respectively treated of the progress of missions in the lake region and the south of Africa; and M. Morin had read a paper on anticipated progress in Cochin-China and Tongking. After a passing reference to the possibility of Korea being opened to foreigners, the President alluded more particularly to the National Congress of French Geographical Societies to be held at Lyons in August next, on which occasion it was proposed to organise a geographical expedition, and he expressed a hope that everything would be done locally to make the Congress a success, the more so because it was at Lyons that the first provincial Geographical Society was formed. The General Secretary, Lieut.-Colonel Debize, afterwards read a report of the proceedings of the Geographical Congresses held during the year 1880 at Nancy and Rheims. In concluding his Report, which will be published in the forthcoming number of the Society's Bulletin, Lieut.-Colonel Debize, after giving a sketch of the history of Geographical Congresses and insisting upon their usefulness, expressed a wish that the meetings of the Congress of the French Geographical Societies should only take place every fifth year, and in that in which the International Congress is held.

Geographical Society of Berlin.—December 4th, 1880: Dr. NACHTIGAL, President, in the Chair.—At the conclusion of the preliminary business, the President communicated to the Meeting a short letter just received from the African traveller, Dr. Hildebrandt, in Madagascar, which contains the first news forwarded by him after an interval of six months, and is the more gratifying as reports of his serious illness, and later on of his death, had come to hand. Dr. Hildebrandt writes that on his journey from the west coast to the central plateau, and when only a few miles' distance from Antananarivo, he suddenly fell ill of a gastric disorder accompanied by bleeding. He lay in a hut in a prostrate condition, when happily succour arrived from the capital in the person of Mr. Cousins, who had him removed to Antananarivo, where he was hospitably received in the house of Dr. Bordegrewinck, the head of the Norwegian Mission. Towards the end of July he had so far recovered as to be able to proceed to the hot sanitary springs of Sirabé in Betsileo (Central Madagascar), whence his letter of the 2nd September, 1880, is dated. The traveller now felt himself strong enough to undertake the working up of his reports, which we may hope to receive shortly. He despatched at the same time the skeleton and the skull of an extinct species of hippopotamus, which he had dug out of a swamp.—The French Government have telegraphed the news of the safe arrival of Dr. Oscar Lenz at Medina, the last French outpost in Senegambia. Dr. Lenz, therefore, is the first European who has accomplished the journey from Timbuktu to the Senegal.—Mr. Flegel, who is visiting the Binué for the second time, has proceeded to Rabba on the Niger, in order to obtain from the king of Nupe the necessary permission to explore that portion of the Niger between Jauri and Sai, which is still totally unknown. He has sent home his meteorological journals.—Dr. Pogge and Lieutenant Wissmann, who, by commission of the German African Society, are again on their way to the kingdom of the Muata-Yanvo, sailed from Lisbon for Angola on the 5th December last.—Dr. Richard Kiepert next addressed the Meeting, on the travels of Mr. Charles Doughty in North-western Arabia, and Dr. Holub gave a description of the kingdom of the Marutze-Mabunda.

Imperial Geographical Society of St. Petersburg.—December 16th, 1880: M. Semenof, Vice-President, in the Chair.—The Chairman announced that Colonel Prejevalsky was shortly expected to return to St. Petersburg, and that he would be received by the Committee of the Society at the railway station, and an extraordinary meeting of the members would be held in his honour. Colonel Prejevalsky had further been elected an honorary member of the Society, in recognition of his great services to geography. The return to St. Petersburg was also reported of MM. Pevtsof and Potanine, who had been engaged in explorations in Central Asia. It was stated that the Society was preparing to take part in two scientific enterprises, viz. the organisation of international Polar stations, and the exploration of the island of Sakhalin (Saghalien). The latter will be conducted under the leadership of M. Poliakof, while the former project is now on the point of being carried out. Lieutenant Jurgens has been appointed chief of the Russian Polar station on the river Lena, and a portion of the necessary instruments have been already purchased, and the remainder ordered in England.—Lieutenant Jurgens is preparing himself for his future work by a year's study at the Pulkova Observatory. A second station in connection with that on the Lena, which was to have been established on one of the islands of New Siberia, will be organised at the mouth of the Kolyma. M. Mushketof afterwards spoke on the subject of his journey in Central Asia and his ascent of the Zarafshan glacier.* The following are the chief results of M. Mushketof's investigations:—(i) The Zarafshan glacier, which is 20 miles in length, can be crossed, though not without encountering some difficulties; (ii) it belongs to the category of intermittent glaciers, such as are met with in the Alps; (iii) there appears to be no ground for M. Fedchenko's supposition that the Zarafshan glacier is connected with that of Shchuransky; (iv) the extent and solidity of the glacier are accounted for by the size of its basin and the number of its feeders; and (v) topographical conditions have a considerable effect on its development. The expedition has further ascertained that the mountains of Turkistan and of Hissar are orographically independent, and that the former are a continuation of the Alai range.

Geographical Society of Lisbon.—December 22nd, 1880.—It was resolved to publish as a pamphlet the information furnished at this and the previous meeting by Major Machado on the condition of the colony of Mozambique.—The following were elected officers of the Society:—President, Dr. J. V. Barbosa de Bocage; Vice-President, Senhor A. A. d'Aguilar; first Secretary, Senhor Luciano Cordeiro; second Secretary, Senhor R. A. Pequito; Treasurer, Senhor J. H. Ulrich, junior;

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* See vol. ii. p. 765.

Assessors, Conde de Ficalho and Senhor G. A. Pery; Assistant Secretaries, Senhor Luiz F. M. Ferreira and Senhor Nuno de Freitas Queriol.

Geographical Society of Cairo.—December 17th, 1880: General STONE-PACHA, President, in the Chair.—Prince Giovanni Borghese and M. Vossion, recently appointed French Vice-Consul at Khartum, were unanimously elected honorary members of the Society.—General Stone read a paper on the hydrography of the equatorial lakes and the White Nile, considered in their relation to the irrigation of Egypt, in which he insisted on the necessity of making careful and continuous observations on the movement of the waters of the river, because on them depended the fertility and prosperity of the country. He also urged that equally careful and continuous observations ought to be made simultaneously and with the same object on the great equatorial lake-reservoirs.— The General Secretary afterwards gave a summary of recent geographical news from different parts of Africa.

NEW BOOKS.

(By E. C. RYE, *Librarian* R.G.S.)

EUROPE.

Spanien.—In Schilderungen von Theodor Simons, reich illustrirt von Professor Alexander Wagner in München. Berlin (Paetel): fo., pp. 347. (*Williams & Norgate:* price 2*l.* 18*s.*)

This splendidly illustrated work is now completed.

ASIA.

Hoskiær, V.—Reise i China, Japan og Indien. Kjøbenhavn (W. Prior): 1880, sm. 8vo., pp. 415, maps.

The author's journeys were made in 1871–76. The maps are clearly executed; only one, the route from Foochow to Amoy, is of any but general value. There is a well-selected list of books and papers on China, Japan, and India, slightly disfigured by the apparently inevitable confusion in author's names (e. g. "Farguson's" History of Indian Architecture).

Koechlin-Schwartz, A.—Un Touriste au Caucase. Volga, Caspienne, Caucase. Paris (Hetzel): 12mo. [n.d.], pp. 351, map. (*Dulau:* price 2*s.* 6*d.*)

The author's route was from Moscow down the Volga to Astracan, thence by the western side of the Caspian (by water) to Baku, from which point he visited Elizabethpol, Tiflis, and Poti, then striking northwards through Central Caucasus to Mozdok and reaching Charkow viâ Taganrog. No date is given.

Marvin, C.—The Eye-Witnesses' Account of the disastrous Russian Campaign against the Akhal Tekke Turcomans, describing the march across the Burning Desert, the storming of Dengeel Tépé, and the disastrous retreat to the Caspian. London (W. H. Allen): 1880, 8vo., pp. 377, maps, plans, portraits. Price 18*s.*

The author has compiled this account, which necessarily contains much topographical matter concerning the course of the Sumbar and the northern side of the Kopet Dagh, otherwise inaccessible, from the files of the *Golos*, *Turkestanski Vedomosti*, and various other Russian journals, the accounts in which were written on the spot. The sketch-maps are drawn from the Russian official maps of Central Asia published in 1877 and 1878, in the latter of which the Persian frontier is moved from the Kopet Dagh to the southern bank of the Attrek.

Temple, Sir Richard, Bart.—India in 1880. London (Murray): 1880, 8vo., pp. 524, maps. Price 16*s.*

Although not specially devoted to geography, the subject is incidentally included in the discussion of the various physical points of interest and beauty, the works of irrigation, road, river, and rail communication, cultivation, &c. The maps show mountain ranges and railway systems.

Tozer, H. F.—Turkish Armenia and Eastern Asia Minor. London (Longmans): 1881, 8vo., pp. 470, map, pls. Price 16*s.*

The author's journey was performed in 1879, in company with Mr. Crowder. His route, shown on the map (scale, 75 miles to the inch), was from Samsoun on the southern side of the Black Sea southwards to Kaiserieh by Amasia and Yeuzgatt, with excursion round Mount Argæus to Urgub. Argæus was ascended, without difficulty, to within 50 feet of the actual summit; and was found by aneroid to be 13,150 feet above sea-level. The rocks at the greatest elevation reached were perforated in some places with ancient human habitations. From Kaiserieh, the travellers proceeded north-east along the Halys to Sivas, and through the Anti-Taurus ranges to Kharput and Lake Gheuljik, arriving at Tadvan, the south-western extremity of Lake Van, after visiting Bitlis, viâ Palu and the region north of the Murad, which was crossed between S. Garabed and Mush. The western and part of the northern shores of Lake Van were followed by Akhlat and Adelgivas, at the foot of Mount Sipan, whence the lake was crossed to Van. From that point, Pergri at the north-eastern extremity was reached, and after striking north to Diyadin, the author turned west across the Alashgerd plain, arriving finally at Trebizond by Delibaba, Erzeroum, the Kop Dagh, and Baiburt.

The primitive antiquities and rock-dwellings, and the identification of classical localities, with other historical matter, naturally form the chief features of the work; but the author gives many particulars as to the present condition of the country and its people, with the prominent geographical features. The pinnacles of Mount Argæus, the Euphrates at Keban Maden, and Mount Sipan and Lake Van are among the illustrations.

AFRICA.

Mitchinson, A. W.—The Expiring Continent: a Narrative of travel in Senegambia, with observations on native character, the present condition and future prospects of Africa, and Colonisation. London (W. H. Allen): 1881, 8vo., pp. 469, map, illustrations. Price 18*s.*

The author's journey (no dates are given) was up the Senegal to the confluence of the Falémé in the Gallam country; thence he ascended the eastern or main stream to Govina, and struck south by land to Gourba in the Bambouk country, continuing his explorations to the south-east to Koria on the Bafing tributary. Returning to Gourba, he went westwards to Farabana, and then descended the Falémé to the junction, following the Senegal again to its mouth. Subsequently he visited Bathurst, and describes the Gambia as far as Baraconda. The map shows the courses of the two rivers to the limits mentioned.

AMERICA.

Costa, B. F. de.—Cabo de Baxos, or the place of Cape Cod in the old Cartology, with notes on the neighbouring coasts. New York (Whittaker): 1881, 8vo., pp. 13, map.

Revised and separately published, from the New-England Historical and Genealogical Register, January, 1881. An elaborate tracing of the different names and positions assigned to Cape Cod from the earliest known maps to the present time, with comparative illustrative extracts from Verrazano and Mercator.

[Vidal Gormaz, F.]—Noticias sobre las Provincias Litorales correspondientes a los Departmentos de Arequipa, Ica, Huancavelica i Lima, por la Oficina Hidrográfica. Santiago (Imprenta Nacional): 1880, 8vo., pp. 40, map.

The northward extension of the official Chilian publications upon Peruvian territory apparently continues with the war operations. The present instalment comprises the littoral region from Islay to Puerto Chilca, well shown on a map, scale 17 miles to the inch.

ARCTIC.

Hellwald, F. von.—Im ewigen Eis. Geschichte der Nordpol-Fahrten von den ältesten Zeiten bis auf die Gegenwart. Stuttgart (Cotta): 1881, pp. 953, map, illustrations. (*Dulau:* price 1*l.*)

A popular history of North Pole Voyages. The chief map is circumpolar, from Stieler's Hand Atlas.

Markham, A. H.—A Polar Reconnaissance, being the voyage of the *Isbjörn* to Novaya Zemlya in 1879. London (C. Kegan Paul): 1881, 8vo., pp. 361, maps, pls. Price 16*s.*

Contains the details of the cruise with Sir H. Gore Booth, of which the chief features have been reported in our 'Proceedings' (1880, p. 7 *et seq.*), from which also the maps are taken. The illustrations of scenery, from photographs, are effective. The plants and zoological objects collected are worked out in the appendices by various scientific authorities.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Dufour, General G. H.—Karte der Schweiz in IV. Blättern nach dem topographischen Atlasse des Eidgenössischen Generalstabes, reduziert unter der Direction des Herrn Generals G. H. Dufour. Scale 1 : 250,000 or 3·4 geographical miles to an inch. 1880. (*Dulau.*)

Elie de Beaumont, Jacquot, &c.—Carte géologique détaillée de la France. Scale 1 : 80,000 or 1 geographical mile to an inch. Sheets:—50. Chalons, price 5*s.* 3*d.* Arcis, price 3*s.* 9*d.* 113. Gray, price 5*s.* 3*d.* 137. Chalon-sur-Saône, price 6*s.* 8*d.* (*Dulau.*)

This geological map is founded upon the map of France published by the "Dépôt de la Guerre," on the scale of 1 : 80,000. A considerable number of sheets have been already issued, each accompanied by an explanatory notice, besides which it comprises many supplementary maps showing different sections of strata, and illustrated examples of palæontological product, together with four volumes of explanatory matter. It promises to form a most complete work.

Johnston, W. & A. K.—Map of Middlesex, constructed from the Ordnance Survey. On rollers. Scale 1 : 32,000 or 2·2 inches to a geographical mile. W. & A. K. Johnston, Edinburgh and London. 1881.

Ministre de l'Intérieur.—Carte de France dressée par le Service Vicinal. Scale 1 : 100,000 or 1·3 geographical mile to an inch. Sheets:—XI.—11. Douvres-la-Délivrande. XVII.—12. Senlis. XVIII.—8. Cambrai. XIX.—8. Le Chateau. XIX.—14. Romilly-sur-Seine. XX.—8. Avesnes. Price of each sheet, 7*d.* (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Phänologische Karte von Mittel-Europa, Bezogen auf die April-Blüthen von Giessen. Von Prof. Dr. H. Hoffmann. Scale 1 : 3,700,000 or 50·3 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 2. Justus Perthes, Gotha. (*Dulau.*)

Philip, G., & Son.—New Map of the County of Middlesex, with portions of the adjoining counties. From the Ordnance Survey. On rollers. By J. Bartholomew. Scale 1 : 31,680 or 2·3 inches to a geographical mile. G. Philip & Son, London, 1881.

Prussian Government.—Generalstabskarte d. Deutschen Reiches. Scale 1 : 100,000 or 1·3 geographical mile to an inch. 1880. 162 sheets. Price 1*s.* 6*d.* each. (*Dulau.*)

ORDNANCE SURVEY MAPS.

1-inch—General Map:—IRELAND: Nos. 140, 141, 160, 171, 186. Hill shaded, 1*s.* each.

6-inch—County Maps:—

ENGLAND AND WALES: Essex: Nos. 47, 63, 64, 71, 2*s.* 6*d.* each.

SCOTLAND: Inverness: Hebrides, Island of Barra, &c., Nos. 66 and 67, 2*s.* each. Orkney and Shetland: Shetland: Nos. 1, 44, 49, 2*s.* each. Ross and Cromartyshire: No. 77, 2*s.* 6*d.* Ross-shire: Nos. 53, 100, 111, 118, 123, at 2*s.* 6*d.*; No. 131, 2*s.*

IRELAND: Cavan: Nos. 14, 21, revised, 2*s.* each.

25-inch—Parish Maps:—

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Town Plans—10-feet Scale:—

ENGLAND AND WALES: Glamorgan; Cardiff, 27 sheets at 2*s.* (Making 117 sheets.) (*Stanford, agent.*)

ASIA.

Indian Government Survey:—General Maps: Indian Atlas, No. 18, N.W. Part of Bahawalpur. No. 18, S.W. Part of Bahawalpur. No. 22, S.W. Part of Kattywar, including Wadwan. No. 71, N.E. Part of Jubbulpore. No. 95, N.E. Point Narsapur, Godavari Delta. No. 130, N.E. Part of Naga Hills.—India, 1877. Compiled from the most recent Topographical and Revenue Surveys based on the great Triangulation. Engraved in the Office of the Surveyor-General of India, Calcutta. With additions and corrections to April 1880. Scale 64 miles to 1 inch. Bengal Presidency. Lower Provinces: Monghyr, 1836–39 and 1845–47. Scale 1 mile to 1 inch; on 17 sheets. Sheets 7, 8, 14, 15, 16, 17, all second edition.—District Maldah, 1846 to 1849 and 1866 to 1868. Scale 1 mile to 1 inch; on 7½ sheets; sheets 1, 2, 3, 4, 5, 6*a*, 7, and an Index Map. District Rajshahee [Rajshahi]. Scale 1 mile to 1 inch; on 11 sheets. Sheet 11. District Gya, 1841–44. Scale 4 miles to 1 inch. Reprint from Indian Atlas, S. G. O., Calcutta, May 1880.—District Shahabad, 1844–46. Scale 4 miles to 1 inch. Reprint from Indian Atlas, S. G. O., Calcutta, April 1880.—District Julpigoree [Jalpaíguri] and the Native State of Cooch Behar, 1864–68. Scale 4 miles to 1 inch. Reprint from Indian Atlas, S. G. O., Calcutta, July 1880.—District Midnapore. Surveyed in seasons 1870–71. Lower Provinces Revenue Survey. Scale 1 mile to 1 inch. Sheets 1, 2, 3, 4, 7. North-West Provinces: Dehra Municipality Trigonometrical Branch Survey of India, 1875–76. Scale 12 inches to 1 mile; on 2 sheets.

Punjab: Preliminary Map. District Karnal, 1870 to 1873. Scale 4 miles to 1 inch. —Murree (Sanitarium, District Rawalpindi) 1876–78. Scale 10 inches to 1 mile; on 6 sheets.—Gilgit [Gilghit] and surrounding country, 1879. Scale 4 miles to 1 inch.—District Sirsa. Surveyed in seasons 1876–79. Scale 1 mile to 1 inch; on 16 sheets, and an Index Map. Rajputana: Rajputana Topographical Survey, 1878–79. Scale 2 miles to 1 inch. Half degree sheets. No. XII., North (containing sheets 78, 79, 82, 83, of the one-inch map). Parts of Bikaneer and Jodhpore. No. XIII., South Part of Bickaneer. Central India Agency: Gwalior and Central India Topographical Survey, 1877, 1878, 1879. Scale 1 mile to 1 inch. Sheets 83 and 87, containing parts of Oodeypore in Rajputana.—Bhopal and Malwa Topographical Survey, 1877–78. Scale 1 mile to 1 inch; sheet 24, containing parts of Gwalior, Bhopal, Indore, Dewas, and Sundarsi. 44, 46, 48, Parts of Gwalior, Indore, Dhar, &c.—Dewas. Central India Agency, 1878–79. Scale 6 inches to 1 mile. Includes the city and environs. Central Provinces: Central Provinces Topographical Survey. Scale 1 inch to 1 mile. Seasons 1868–69–70. Sheet No. 8, second edition.—Central Provinces and Vizagapatam Agency Topographical Survey. Scale 1 inch to 1 mile. Seasons 1861–62 and 1866 to 1868. No. 12, New Series. No. 13, New Series.—Central Provinces and Vizagapatam Agency Topographical Survey. Scale 2 miles to 1 inch. Seasons 1865, 1866, 1867, and 1876–77. Sheets Nos. 35 and 37, New Series; on the same sheet.—Hyderabad Topographical Survey. Scale 1 mile to 1 inch. Seasons 1863, 1864, 1865. Sheets 1, 2, 3, 6, 7, containing only parts of the Upper Godavari District of the Central Provinces. Ganjam and Orissa Topographical Survey, 1862–66. Scale 2 miles to 1 inch. One sheet is a reduction of Nos. 30 New Series and 97 Old Series. Another sheet is a reduction of Nos. 92, 93, 94, 95, Old Series. The contents are in the Central Provinces. Mysore and Coorg: Mysore Topographical Survey, 1876–79. Scale 1 mile to 1 inch. Sheets 31, 32, 33, 35, 37, 38, 41, 42. Parts of Bangalore, Tumkur, Kolar, and Chitaldroog Districts. Assam: Assam. In 9 sheets. 1880. Scale 8 miles to 1 inch. Sheets 2, 3, 7 and 8 in one, 9 containing only Title and Index.—Khasia [Khasi] and Garo Hills Topographical Survey. Scale 2 miles to 1 inch. Seasons 1864–67 and 1876–78. Sheets 14, 15, second edition. British Burma: Plan of the Town and Suburbs of Rangoon, with the New Municipal Limits, including the Cantonment. Surveyed under the superintendence of Lieutenant F. L. Seaton, Her Majesty's late Indian Navy. Surveyed in 1874–75, and corrected up to May 1877, with the addition of all important changes up to January 1880. Scale 400 feet to 1 inch; on 9 sheets. Madras Presidency: Godavari District. Hyderabad Topographical Survey. Scale 1 mile to 1 inch. Season 1865–66. Sheets 14, 17. Parts of Rakapali and Badrachellum Taluks, in Godavari District. Bombay Presidency: Khandesh and Bombay Native States Topographical Survey. Scale 1 mile to 1 inch. Seasons 1877, 1878, 1879. Sheets 30, 33, 35. Parts of Khandesh, Chota Udepur, Mathwar, Garh [Garhi], and Kathi. Deccan Topographical Survey. Scale 1 mile to 1 inch. 1, 2, 2*a*, 3, 3*a*, 4, 4*a*, 5, 6, 7, 8, 9, 10, 11, 11*a*, 12, 13, 14, 15, 16, 17, 19, 20, 21, 21*a*, 23, 24, 25, 25*a*, 30, 35, 36, 37, 38, 39, 39*a*, 41, 42, 43, 44, 45, 47, 48, 52.—Guzerat. Trigonometrical Branch, Survey of India. 1877–78. Scale 2 miles to 1 inch. Nine sheets, numbered as follows:—Sheet 6, Sections 1, 2. Sheet 7, Sections 1, 2, 3, 4. Sheet 27, Sections 1, 2, 3, 4.—Sheets No. 25 and No. 27 of Guzerat. Trigonometrical Branch, Survey of India. 1878–79. Scale 1 mile to 1 inch. Including parts of Ahmedabad, Kaira, and Panch Mahals Districts, with parts of the Gaikwar's (Baroda), Mahi Kanta, and Rewa Kanta States. Sheet No. 53 of Kattywar. Trigonometrical Branch, Survey of India. Part of Hallar. Scale

1 mile to 1 inch. Season 1878–79. North-Western Frontier of India: Seat of War in Northern Afghanistan, taken principally from Surveys and Reconnaissances by Officers of the Survey of India, 1878–79–80. Scale 4 miles to 1 inch. Second edition. (*Stanford, agent.*)

Note.—The names in brackets [ ] are authorised spellings.

Petermann's 'Geographische Mittheilungen.'—N. A. Sewerzow's Erforschung der Östlichen Pamir, Aug.–Sept. 1878. Reduction der Routen-Aufnahme von Topograph A. Skassi. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1880, Tafel 19. Justus Perthes, Gotha, 1880. (*Dulau.*)

AFRICA.

Grandidier, Alfred.—Esquisse d'une Carte de la Province d'Imerină (Madagascar) dressée par Alfred Grandidier. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Paris, December 1880.

Intelligence Branch, Quartermaster-General's Department. — Map of Basutoland and adjacent Territories; compiled at the Intelligence Department, Horse Guards, from the latest information obtained from the Surveyor-General, Cape Colony, the Resident Magistrates, and other available sources. Scale 1 : 633,600 or 8·6 geographical miles to an inch. London, 1880.

—— Map of the Transvaal; compiled and lithographed at the Intelligence Department, Horse Guards, 1881. Scale 1 : 633,600 or 8·6 geographical miles to an inch.

—— Sketch Map showing Lines of Communication with Zululand and Transvaal; compiled and lithographed at the Intelligence Department, Horse Guards, 1881. Scale 1 : 596,000 or 21·7 geographical miles to an inch.

Petermann's 'Geographische Mittheilungen.'—Originalkarte des Äquatorialen Ost-Afrika zwischen Mombasa und Nijansa. Mit Zugrundelegung der Tana-Fluss. Aufnahme nach den eigenen Erkundigungen über die Handelswege des Innern construirt und gezeichnet von Clemens Denhardt. Scale 1 : 2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 1. Justus Perthes, Gotha. (*Dulau.*)

AMERICA.

De Mot, Ch.—Mapa de la Provincia de Buenos-Aires dividido en partidos por Ch. De Mot. 1880. Scale 1 : 750,000 or 10·3 geographical miles to an inch. Gouweloos, Frères & Sœur, Editores, Brussels. (*Dulau.*)

Rand, McNally, & Co.—New Railroad and County Map of the United States and Canada, compiled from the latest Government Surveys. Scale 1 : 2,000,000 or 27 geographical miles to an inch. Rand, McNally, & Co., Chicago, 1881. Price 3*l.* 3*s.* (*Stanford.*)

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, from July to December, 1880.

No.			Inches.	
588	m	=	5·7	South America, west coast:—Tom Bay anchorages. Price 1*s.* 6*d.*
88	m	=	12·3	Spain, north coast:—San Sebastian. Price 1*s.*
1061	Plan added, Port Eyre.			
1806	m	=	0·1	Africa, west coast:—Great Fish bay to Walfisch bay (plan, Great Fish bay). Price 2*s.* 6*d.*

No.			Inches.	
2648				Plan added, Bay and port of Les Sables d'Olonne.
263				Plan added, St. Francis harbour.
269				Plan added, St. Augustine harbour.
1382	m m m	= = =	0·5 2·0 4·0	Tahiti and Moorea (Otaheité and Eimeo) plans, Papetoai and Cook bays. Harbours and anchorages on the north coast of Tahiti. Price 2*s*. 6*d*.
2450	m	=	0·5	England, south coast:—Portland to Owers. Price 2*s*. 6*d*.
2306				Plan added, approaches to Bud.
865	m	=	6·0	South America, west coast:—Anchorages in Wide channel and Indian reach—Grau; Elena; Sandy, coves. Port Micaela. Chacabuco bay. Price 1*s*.
2398	m	=	0·25	South Indian Ocean:—Kerguelen island. Price 2*s*. 6*d*.
1508	m	=	various.	South-west Pacific:—Anchorages in the New Hebrides; plans, ports Resolution, Stanley; Lisburn, Dip Point, Rodds, Sangalie, Sakau anchorages; Lakova, South-West, Steep Cliff bays; Maskeleyne, Shepherd islands, and Bice road. Price 1*s*. 6*d*.
649	m	=	3·0	Australia, E. C. Queensland:—Mary river. Price 2*s*.
2158 *a*, *b*.	d	=	2·0	Mediterranean; eastern and western sheets. Price, each 5*s*.
1875	m	=	0·5	North sea:—Elbe, Weser, and Jade rivers. Price 2*s*. 6*d*.
56	m	=	3·0	India, west coast: Ratnagiri, Mirya, and Kalbadavie bays. Price 1*s*. 6*d*.
459	m	=	various.	West Indies, Jamaica: Montego and Carlisle bays, port Marie, Dry, Green island, St. Lucia and Manchioneal harbours, Mosquito cove, Blewfields anchorage. Price 1*s*. 6*d*.
448	m	=	0·75	West Indies, Jamaica: Pedro bluff to South Negril point. Price 2*s*. 6*d*.
859	m	=	0·2	India, Bay of Bengal:—Mutlah river to Elephant point. Price 2*s*. 6*d*.
880	m	=	1·5	West Pacific:—Solomon islands; Marau sound. Price 1*s*. 6*d*.
989	m	=	0·25	Gulf of Siam: Lacon roads to Lem Tane. Price 2*s*.
1935	m	=	1·0	Falkland Islands:—Bay of Harbours and Bull road. Price 1*s*.
2890	m	=	0·4	North America, east coast, Nantucket shoals to Block island (plan added, Vineyard haven). Price 2*s*. 6*d*.
562	m	=	14·0	Spain, east coast:—Port of Valencia. Price 1*s*.
165	d	=	6·3	Mediterranean:—Sardinia to Malta, including Sicily. Price 3*s*.
1401	m	=	3·0	Mauritius:—Grand port. Price 2*s*.
1362	m	=	0·25	Africa, west coast:—Grand Bereby to cape Three Points. Price 2*s*. 6*d*.
881	m	=	1·4	Norway, west coast:—Approaches to Haugesund. Price 1*s*. 6*d*.
2223	m	=	1·46	Sweden, south coast:—Carlskrona harbour. Price 1*s*. 6*d*.
70	d	=	1·4	East Indies, Bay of Bengal. Price 2*s*. 6*d*.
246	m	=	0·08	Africa, north coast:—Ras Makhabez to Ben-Ghazi (plans, Zouaga; Dzeira or Zoraik, ports. Oms bay. Ras Elmsel; Marsa Ougrah; cape Misratah, anchorages, Marta Zafran or port Chebek. Marsa Brega (Boureigah). Price 2*s*. 6*d*.
2620	m	=	0·5	England, south coast:—Dodman point to Portland (plan, Eddystone rocks). Price 2*s*. 6*d*.

No. Inches.

2430 m = 0·13 North America, west coast:—Queen Charlotte islands, and adjacent coast of British Columbia. Price 1*s.* 6*d.*

8 *e* Plan added, 'Asab bay.

2265 Plan added, port Golfito.

2720 Plan added, Bang-Pak-Kong river.

479 Plan added, Mona island.

878 m = 6·0 Patagonia, west coast:—Port Henry. Price 1*s.* 6*d.*

2598 The World: — Curves of equal Magnetic Variation. Price 3*s.* 6*d.*

1440 m = 0·08 Mediterranean:—Adriatic. Price 2*s.* 6*d.*

877 m = 0·62 South America, west coast:—Guia narrows to Concepcion channel (plans, Hugh bay, Landslip sound, Wide bay Paroquet cove, Port Ochovario). Price 1*s.* 6*d.*

879 m = 3·0 South America, west coast:—Alert harbour, Kathleen anchorage and port Charrua. Price 1*s.* 6*d.*

709 m = 0·28 Sumatra, west coast:—Priaman to Oujong Indrapoera. Price 2*s.*

833 m = 1·45 Norway, south coast:—Söngdalstrand and Bekefiord anchorages. Rasvaag and Kirkehavn anchorages. Approaches to Ekersund. Flekkefiord anchorages. Approaches to anchorages between The Naze and Farsund. Price 1*s.* 6*d.*

560 m = {6·0, 2·05} South America, west coast:—Port Riofrio. Crossover island to Gorgon reef. Price 1*s.* 6*d.*

2304 Plans added, Approaches to Bergen. Approaches to Lervig.

2746 Plan added, La Rochelle.

764 Plan added, Duke of York group.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
23	Plan, Tom bay on this sheet ..	New plan, Tom bay anchorages	588
1806	Great Fish bay	New chart, Great Fish bay to Walfisch bay	1806
265	Sealing bight and St. Francis harbour	Plan of St. Francis harbour on	263
1382	Otaheité and Eimeo	New chart, Tahiti and Moorea	1382
526	Plans on this sheet, Talloo and Avootai harbours	Ditto ditto	
2450	Portland to Portsmouth ..	New chart, Portland to Owers	2450
2398	Kerguelen island	New chart, Kerguelen island	2398
1508	Resolution bay	New chart, anchorages in the New Hebrides	1508
2718	*a*, *b*, *c*. Mediterranean, three sheets	New charts, Mediterranean Sea, eastern and western ..	2158 *a*, *b*
2158	Mediterranean		
1875	Elbe river (to Hamburgh) ..	New chart, Elbe, Weser, and Jade rivers	1875
56	Ratna Ghíri	New chart, Ratnagiri, Mirya, and Kalbadavie bays ..	56
459	Savanna la Mar, &c.	New chart, Pedro bluff to South Negril point	448
447	Green island harbour	New chart, anchorages in Jamaica	459
448	St. Lucia harbour		
449	Mosquito cove		
450	Montego bay		
458	Blewfields anchorage		

No.		Cancelled by	No.
1935	Bull road	New plan, Bay of Harbours and Bull road	1935
2890	Nantucket shoals to Block island	New chart, Nantucket shoals to Block island	2890
165	Sardinia to Malta	New chart, Sardinia to Malta	165
562	Valencia, port of	New plan, port of Valencia	562
1362	Cape Palmas to Grand Lahou	New chart, Grand Bereby to cape Three Points	1362
1364	Grand Lahou to cape Three Points		
2223	Carlskrona harbour	New plan, Carlskrona harbour	2223
1588	Dulcigno road		
70 *a*, *b*.	Bay of Bengal	New chart, Bay of Bengal	70
246	Misratah to Marsa Sousah	New chart, Ras Makhabez to Ben-Ghazi	246
247	Tripoli to Misratah		
25	Dodman point to Start point	New chart, Dodman point to Portland	2620
2620	Start point to Portland		
2430	Vancouver island to Cordova bay, and adjacent shores of British Columbia	New chart, Queen Charlotte islands, and adjacent coasts of British Columbia	2430
2804	Plan of Port Henry on this sheet	New plan, port Henry	878
138 *a*, *b*, *c*.	Sea face of Soonderbunds		
2598	Curves of equal Magnetic Variation	New chart, curves of equal Magnetic Variation	2598
1440	Adriatic	New chart, Adriatic	1440
2804	Plan of Guia narrows on this sheet	New chart, Guia narrows to Concepcion channel	877
560	Port Riofrio and Crossover island to Gorgon reef	New chart, Port Riofrio. Crossover island to Gorgon reef	560

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2608. France, south coast:—Hyères to Rade d'Agay. No. 214. Pacific ocean:—Solomon islands. No. 298. Newfoundland:—St. John's harbour. No. 1951. England, west coast:—Liverpool bay. No. 2666. North America, east coast:—St. John's (Newfoundland) to Halifax (Nova Scotia). No. 2458. England, Thames river:—Gravesend to the Nore. No. 2660*b*. China sea, southern portion. No. 2082. Africa, south coast:—Table bay to cape Agulhas. No. 88. Spain, north coast:—Port San Sebastian. No. 2050. England, south coast:—Spithead and approach from the eastward. No. 347. Australia, east coast:—Percy isles to Whitsunday island. No. 2400. China, east coast:—Min river. No. 2120. New Guinea, south coast:—Aird river to Freshwater bay. No. 1639. Gulf of Mexico:—Mississippi river to Boquillas Cerrados. No. 483*b*. West Indies:—Trinidad island and Paria gulf. No. 1801. South America, east coast:—Trinidad island to Surinam. No. 2305. Norway, sheet 3:—Stav fiord to Romdals islands. No. 241. Mediterranean:—Ben Ghazi to Dernah. No. 2690. France, west coast: Brest roadstead. No. 1302. South America, west coast:—Ports Caldera and Yngles, &c. No. 2148. North America, west coast:—Fonseca gulf to Sonsonate road. Spain, east coast:—Port Alfaques. No. 1687. Mediterranean, Sicily:—Messina harbour. No. 1526. Mediterranean, Greece:—Mandri channel. No. 1061. Australia, south coast:—Cape Catastrophe to the Great Australian bight. No. 1678. Mediterranean, Adriatic:—Plans of ports. No. 2348. North America, west coast:—Sitka or New Arkhangel. No. 2609. France, south coast:—Rade d'Agay to St. Remo. No. 2606. France, south coast:—Les Saintes Maries to Marseille. No. 1187. Mediterranean:—Alicante to Palamos, and the Balearic islands.

No. 2762. South Indian ocean:—Comoro island, with the adjacent coasts of Africa and Madagascar. No. 1759. China:—Pih-ki-shan to Hie-shan islands. No 2219. England, south coast:—Needles and North channels. No. 120. North Sea:—River Schelde, from the sea to Antwerp. No. 2521. New Zealand:—Tauranga harbour. No. 263. Labrador:—Cape St. Charles to Sandwich bay. No. 1730. South Pacific ocean:—Samoan or Navigator islands. No. 269. United States, east coast:—Sapelo sound to Florida and Providence channels. No. 2664. France, west coast:—Pte. d'Arcachon to pte. De la Coubre. No. 2306. Norway, sheet 4:—Romdals islands to Hitteren islands. No. 2764. Australia:—Coral sea and Great Barrier reefs. No. 802. South Indian ocean:—Prince Edward, Crozet head, and McDonald islands. No. 2220. Black sea ports. No. 255. Jamaica:—Morant point to port Royal. No. 2645. West coast of France:—Isle de Groix to Raz de Sein. No. 99. French Guiana:—Salut islands anchorage. No. 2431. North America, west coast:—Port Simpson to Cross sound. No. 47. India, west coast:—Bate harbour. No. 2221. Black sea:—Port Saijak. No. 1354. Falkland islands. No. 2665. France, west coast:—Bidassoa to point D'Arcachon. No. 2763. Australia, north-east coast:—Coral sea and Great Barrier reef. No. 2411. New Zealand:—Otago harbour. No. 8 *e*. Red Sea, sheet 3. No. 1685. Mediterranean, Greece:—Venetico to cape Malea. No. 847. Mediterranean, Cyprus:—Famagousta. No. 2691. South Pacific ocean:—Fiji islands. No. 123. Africa, south coast:—Table bay breakwater and docks. No. 2436. China, Liu Kiu islands:—Port Oonting. No. 2853. United States, east coast:—Mississippi sound, Mobile bay, &c. No. 832. Bengal bay:—Cheduba strait. No. 1822. Borneo:—Sarawak river. No. 2843 *a* and *d*. United States, east coast:—Chesapeake bay. No. 624. Australia, south coast:—Hobson bay and Yarra river to Melbourne. No. 2205. Black sea:—Kertch strait. No. 2045. England, south coast:—Owers to Christchurch, with Spithead and the Isle of Wight. No. 2720. Gulf of Siam:—Koh-Ta-Kut to cape Liant. No. 446. West Indies:—Jamaica. No. 479. West Indies:—Anchorages in Puerto Rico. No. 2602. France, north coast:—Cherbourg. No. 360. North Atlantic ocean:—Bermuda islands. No. 2804. South America:—Plans on west coast of Patagonia. No. 2612. France, north coast:—Trouville to Dieppe. No. 1313. South America, Chile:—The channels between port de Ancud and port Montt. No. 554. South America:—Magellan strait. No. 162. Fiji islands:—Goro island. No. 850. North sea:—Noordzee or Ymuiden harbour. No. 2691. Pacific ocean, Fiji islands. No. 2843 *c*. United States:—Chesapeake bay. No. 2819. France, south coast:—Cistat and St. Nazaine bays. No. 2119. Australia, east coast:—Newcastle harbour. No. 946. Borneo:—Malludu bay.

Dépôt des Cartes et Plans de la Marine.—No. 3754. Cartes des Courants de Marée de la Manche. Feuille 1. Courant principal, établissements, vitesses, directions. 1880.—No. 3755. Cartes des Courants de Marée de la Manche. Feuille 2. Composantes du Courant, établissements, vitesses. 1880.—No. 3711. Côte Ouest de France. Embouchure de la Charente. Rades de l'Ile D'Aix et des Trousses. 1879.—No. 3628. Mer du Nord. Carte des Côtes Ouest de Norvège de Feyeö à Rundö. 1878.—No. 3734. Mer Baltique. Fiord de Kiel. 1879.—No. 3751. Mer Baltique. Côte de Prusse. Neufahrwasser. Chenal et Port de Pillau.—No. 3756. Mer Baltique. Côte de Prusse. Port de Memel. 1880.—No. 3760. Mer Méditerranée. Corse. Plan de la Baie d'Ajaccio. 1880.—No. 3645. Mer Méditerranée. Côte S.E. de l'Espagne. Anse de Mazarron et Mouillage de la Subida. 1878.—No. 3731. Sicile. Côte Nord-Ouest du Cap Cefalù a Mazzara. 1879.—No. 3744. Mer Adriatique. Côte Orientale, de l'Ile Cherso a Novigrad, Golfe de Quarnero. 1880.—No. 3728. Mer Adriatique. Ile

Céphalonie. Port Argostoli. 1879.—No. 3695. Ports et Canaux de Venise. 1879.—Port de St. Nicolas du Lido. Entrée de Malamocco.—No. 3747. Mer Ionienne. Ile Sainte Maure. Chenal de Meganisi et Port Vliko. 1879.—No. 3730. Mer Rouge. Port Massouah ou Musawwa'. 1879.—No. 3723. Mer Rouge. Plan du Mouillage Intérieur de Djeddah. 1879.—No. 3741. Golfe du Bengale. Port Puket ou Tonkah (Côte Est de l'Ile Junkseylon). 1879.—No. 3753. Tong-Kin. Cours du Fleuve Daï. Partie Supérieure. 1880.—No. 3752. Tong-Kin. Cours du Song-Caû et du Thuong-Gian. 1880.—No. 3743. Tong-Kin. Cours du Song Cuong et du Cua Traly. 1879.—No. 3729. Golfe du Tong-Kin. Plan de la Baie Oanh-Xuân (Cap Pac-Lung). 1879.—No. 3742. Tong-Kin. Cours du Dem Gian ou Rivière Phuno. 1879.—No. 3733. Côte Orientale de la Chine. Mouillage de la Pointe Cupchi. Mouillage de la Pointe Breaker. 1879.—No. 3725. Côte Orientale de la Chine, entre Blak Head et la Pointe Crab, comprenant la Passe Blakeney. 1879.—No. 3735. Japon. Détroit de Simonoseki, entrée occidentale du Seto-Uchi. 1879.—No. 3768. Terre Neuve. Croquis de la Baie de l'Ariège. Baie Aux Lièvres. Canal, conduisant à la Baie de l'Ariègo. 1880.—No. 3717. Côte Ouest d'Amérique. Partie Centrale de la Basse Californie et du Golfe de Californie. 1879.—No. 3736. Côte Ouest d'Amérique. Partie Sud de la Basse Californie. 1879.—No. 3719. Côte Ouest d'Amérique. Entrée du Golfe de Californie et partie de la Côte du Mexique, comprise entre le Cap Corrientes et Mazatlan. 1879.—No. 3722. Mer des Antilles. Côte du Venezuela. Plan du Canal au Sud de l'Ile Coche. 1879.

Indian Marine Survey.—Chart No. 25. Gulf of Cutch. Saláya or Seraia, the port of Khambhália (Kattywar). Price 2*s*. No. 1165. Bay of Bengal, Orissa Coast. False Point Harbour and its approaches. Price 2*s*. Published at the Marine Survey Department under the superintendence of Commander A. D. Taylor. Calcutta, 1880.

United States Hydrographic Office.—Chart No. 869. West Coast of South America, Patagonia. Channels between Magellan Strait and the Gulf of Trinidad. Portland Bay in the Concepcion Channel. Surveyed by the officers of H.M. ship *Alert*, Captain Sir George Nares, R.N., commanding, 1879. Price 6*d*.—No. 870. Japan, North Coast of Nipon, Ohama Harbour in Wakasa Bay. From a Japanese Government Survey in 1879. Price 7½*d*.—No. 871. Yellow Sea. West Coast of Korea. A-san Anchorage. From a Japanese Government Survey in 1879. Price 10*d*. Published at the Hydrographic Office, Washington, D.C. 1880. J. C. P. de Krafft, Captain U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Andree, Dr. Richard.—Allgemeiner Handatlas in sechsundachtzig Karten mit erläuterndem Text. Velhagen & Klasing. Bielefeld and Leipzig, 1880. Parts 5, 6, and 7. Price 2*s*. each. (*Williams & Norgate.*)

These 3 parts contain the following maps which are clear and well executed, also letterpress explanatory of the maps:—Part 5: 21. Sprachenkarte von Deutschland. Religionskarte von Deutschland. 22 u. 23. Deutschland politisch. 24. Höhenschichtenkarte von Deutschland. Bevölkerungsdichtigkeit von Deutschland. 45. Völkerkarte von Oesterreich-Ungarn. 46 u. 47. Oesterreichisch-Ungarische Monarchie. 48. Wien, Prag, Buda-Pest nebst Umgegend. Religionskarte von Oesterreich-Ungarn. Part 6: 41. Böhmen und Mähren. 42 u. 43. Die Oesterreichischen Alpenländer. 44. Ungarn. 53. Italien, südliche Hälfte. 54 u. 55. Frankreich. 56. Französische Mittelmeerküste. Paris und die untere Seine. Part 7: 17. Grosser Ocean. Meerestiefen und Telegraphenkabel. Nebenkarten: Tahiti und Moorea. Tonga-Inseln. Markesas-Inseln. 18 u. 19. Deutschland, physikalisch. 20. Isothermen und Windkarte der Erde. Religionskarte von Europa. 77. China und Japan. Nebenkarten: Peking und Umgebung. Tokio und Umgebung. 78 u. 79. Centralasien und Ostindien. 80. Hinterindien und der Malayische Archipel. Nebenkarte: Java.

Bavarian General Staff.—Topographischer Atlas der Konigr. Bayern, bearbeitet im topograph. Bureau d. K. b. Generalstabes. Scale 1:50,000 or 1·4 inch to a geographical mile. Blatt 29. Pegnitz (Ost). 61*a* u. *b*. Wittelsbach (Ost u. West). 62. Pfaffenhofen (West). 63. Landshut (West). 76. Landsberg (Ost). München. Price of each sheet, 1*s*. 6*d*. (*Dulau.*)

—— Terrain-Aufnahmen vom Konigr. Bayern in Horizontal-Curven, bearbeitet im topograph. Bureau d. K. b. Generalstabes. Scale 1:25,000 or 2·9 inches to a geographical mile. Sheet 344. Windsbach. 345. Abenberg. 346. Roth. 368. Gunzenhausen. 369. Spatt. 370. Georgensgmünd. 371. Heideck. 393. Windsfeld. 394. Weissenburg. 396. Thalmässing. 419. Neudorf. (*Dulau.*)

Bevan, G. Phillips, F.S.S., F.G.S., &c.—The Statistical Atlas of England, Scotland, and Ireland. Edited by G. Phillips Bevan, F.S.S., F.G.S., &c. To be completed in fifteen parts, each containing three coloured maps and letterpress. Part I. Religious. W. & A. K. Johnston, Edinburgh and London. 1881. Price 7*s*. 6*d*.

Collins, William, & Sons.—The Comprehensive Atlas of Modern, Historical, Classical, and Physical Geography; consisting of one hundred and twenty maps. With descriptive letterpress of Physical Geography, by James Bryce, M.A., LL.D.; and Indices containing upwards of 50,000 names. William Collins, Sons, & Co., Limited. 1880. Price 3*l*. 3*s*. (*Stanford.*)

The maps contained in this atlas are for the most part reproductions, the originals of which were published on an average seven or eight years ago. Some parts of the Physical portion are good. It is not, however, as free from errors as could be desired, and in one case, that of Map V., Africa, a very serious error occurs, Lake Dilolo being represented as an immense lake, equal in area to Lake Nyassa, whereas it is in fact little more than a very large pond.

Letts, Son, & Co.—Popular Atlas, being a complete series of Maps, delineating the whole surface of the globe, with special and original features, and a copious Index of 23,000 names. Letts, Son, & Co., Limited. London, 1881.

Riess, Dr. R.—The Lands of the Holy Scripture. A geographical and historical atlas of the Holy Bible, intended to serve as an aid to the better understanding of the Sacred text and of Biblical history. Consisting of seven coloured maps, arranged according to the latest and most reliable authorities: folio. Freiburg. Price 2*s*. 6*d*. (*Dulau.*)

Stieler, Adolf.—Hand-Atlas über alle Theile der Erde, neu bearbeitet von Dr. August Petermann, Dr. Hermann Berghaus und Carl Vogel. Parts 15, 16, 17, 18, 19, 20, 21, and Ergänzungsheft I., II. Price 2*s*. each. Justus Perthes, Gotha, 1880. (*Stanford.*)

The contents of these parts of the new edition of Stieler's Hand-Atlas are as follows:—Part 15: No. 32. Süd-Italien. Von A. Petermann. 1 : 1,850,000. Nebenkarten: Neapel und Umgegend 1 : 500,000. Strasse von Messina 1 : 500,000. Palermo und Umgegend 1 : 500,000. Die Insel Sardinien 1 : 1,850,000.—No. 60. Klein-Asien und Syrien nebst den westlichen Theilen von Armenien, Kurdistan und Mesopotamien. Von A. Petermann. 1:3,700,000. Nebenkarte: Smyrna (Ismir) und Umgebung 1:500,000.—No. 76. Polynesien und der Grosse Ocean. Westliches Blatt. Von A. Petermann. 1 : 40,000,000. Nebenkarten: Marianen od. Ladronen-Inseln 1 : 5,000,000. Neu-Caledonien und Loyalty-Inseln 1 : 5,000,000. Viti- oder Fidschi-Inseln 1 : 5,000,000. Tonga- (Freundschafts-) Ins. 1 : 5,000,000. Samoa (Schiffer-) Inseln 1 : 5,000,000. Seypan, Tinian, &c., 1 : 2,500,000. Guam-Insel 1 : 2,500,000. Palaos-Inseln 1 : 2,500,000. Hogolu- (Rug-) Insel 1 : 2,500,000. Ponape- (Ascension-) Insel 1 : 2,500,000. Ualan- (Strong-) Insel 1 : 2,500,000. Bonin-Inseln 1 : 1,000,000. Otdia- (Rumanzoff-) Inseln 1 : 1,000,000. Tongatabu 1 : 1,000,000. Norfolk- und Philip-Inseln 1 : 500,000. Apia-Bay 1 : 250,000. Pagopago-Hafen 1 : 250,000. Part 16: No. 31. Ober- und Mittel-Italien. Von A. Petermann. 1 : 1,850,000.—No. 58. Asien. Übersichtskarte. Von A. Petermann. 1 : 30,000,000.—No. 85. Vereinigte Staaten von Amerika in 6 Blatt. Bl. 3. Von A. Petermann. 1 : 3,700,000. Nebenkarten: Boston und Umgebung 1 : 1,100,000. New York und Umgebung, 1,000,000. Part 17: No. 2. Der nördliche Stern-Himmel (Mitte des 19. Jahrhunderts). Von A. Stieler und Dr. C. Bruhns.—No. 35. Frankreich, Bl. 2. Von C. Vogel. 1 : 1,500,000.—No. 38. Spanien und Portugal. Übersichtskarte. Von C. Vogel. 1 : 3,700,000. Nebenkarte: Lissabon. 1 : 150,000. Part 18: No. 17. Deutschland, Übersicht des Deutschen Reiches. Von Dr. Herm. Berghaus. 1 : 3,700,000.—No. 23. Sachsen, Thüringen und benachbarte Länder. Von C. Vogel. 1 : 925,000.—No. 54. Ost-Europa, Bl. 5: Süd-West-Russland und die Balkan-Halbinsel. Von A. Petermann. 1 : 3,700,000. Nebenkarte: Odessa und Umgebung. 1 : 500,000. Part 19: No. 3. Der südliche Stern-Himmel (Mitte des 19. Jahrhunderts). Von J. C. Bär und Dr. C. Bruhns.—No. 12. Nord-Atlantischer Ocean. Von Dr. Herm. Berghaus. 1 : 28,000,000. Nebenkarten: Westend des ersten Atlantischen Telegraphen. 1 : 1,500,000. Ostend des ersten Atlantischen Telegraphen. 1 : 5,000,000.—No. 14. Das Mittelländische Meer und Nord-Afrika. Ostliches Blatt. Von A. Petermann. 1 : 7,500,000. Nebenkarte: Das Nil-Delta und der Isthmus von Suez. 1 : 1,500,000. Part 20: No. 49. Russland und Skandinavien. Von A. Petermann. 1 : 10,000,000. Nebenkarten: St. Petersburg und Umgebung 1 : 500,000. Moskau und Umgebung 1 : 500,000.—No. 73. Australien. Von A. Petermann. 1 : 10,000,000. Nebenkarte: Sydney und Port Jackson 1 : 150,000.—No. 78. Nord-Amerika. Übersichtskarte. Von A. Petermann. 1 : 25,000,000. Part 21: No. 7. Weltkarte zur Übersicht der Meeresströmungen und des Schnell-verkehrs. Von Dr. Hermann Berghaus. 1 : 111,000,000 (im Aequator). Nebenkarten: Linien gleicher Gezeiten od. Fluthstunden. Nördl. Halbkugel. Linien gleicher Gezeiten od. Fluthstunden. Südl. Halbkugel. 1 : 140,000,000 (im Aequator). Linien gleicher Temperatur der Meeresfläche im kältesten Monat. 1 : 280,000,000 (im Aequator).—No. 21. Deutsches Reich in 4 Blatt. Blatt 3. Von C. Vogel. 1 : 1,500,000.—No. 29. Länder der Ungarischen Krone: Ungarn, Siebenbürgen, Slavonien und ein Theil von Kroatien. Von Dr. Hermann Berghaus. 1 : 1,850,000. Nebenkarte: Pest-Ofen. 1 : 500,000. Ergänzungsheft I.: Petermann: Karte des Mittelländischen Meeres, Lieferung I. enthaltend Blatt 1, 5, 8. 1 : 3,500,000. Ergänzungsheft II.: Petermann: Karte des Mittel-Meeres. 8 colorirte Karten in Kupferstich. 1 : 3,500,000. Blatt 2, 6, 7.

Swiss Federal Government.—Atlas Topographischer der Schweiz im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868, vom eidgenossischen Stadbüreau veroffentlicht. Scale 1 : 25,000 or 2·9 inches to a geographical mile. Bern. Parts 15 and 16, each containing 12 coloured maps. Price 13*s.* per part. (*Dulau.*)

EDUCATIONAL.

Collins, William, & Sons.—The Student's Atlas of Modern and Physical Geography, consisting of fifty-two maps, with descriptive letterpress of Physical Geography by James Bryce, M.A., LL.D. With copious Index. William Collins, Sons,

& Company, Limited, Glasgow, London, and Edinburgh. 1880. Price 10*s.* 6*d.* (*Stanford.*)

Contains numerous errors, of which the following are examples. In map No. 5 the Orange Free State is coloured as British territory, and the Transvaal as independent, the reverse of which would of course be correct; and in the Physical portion, in map No. 4, one of the great physical features of Africa—the Congo River, in its course as discovered by H. M. Stanley—is altogether left out, while Victoria Nyanza is laid down incorrectly. It is to be regretted that these errors should occur in an atlas professedly prepared for educational purposes.

Schultz.—Schul-Wandkarte von Oesterreich-Ungarn. Scale 1:1,100,000 or 15 geographical miles to an inch. Klare Terraindarstellung bei entsprechender Detaillirung des Gerippes. Bemerkenswerth ist ein Höhen-Profil der österr. Berge, Pässe, Orte, Seen, etc., mit Scalen-Eintheilung in Fuss und Metermaass. Artaria & Co., Vienna, 1880. 6 sheets. Price 8*s.* 10*d.* (*Dulau.*)

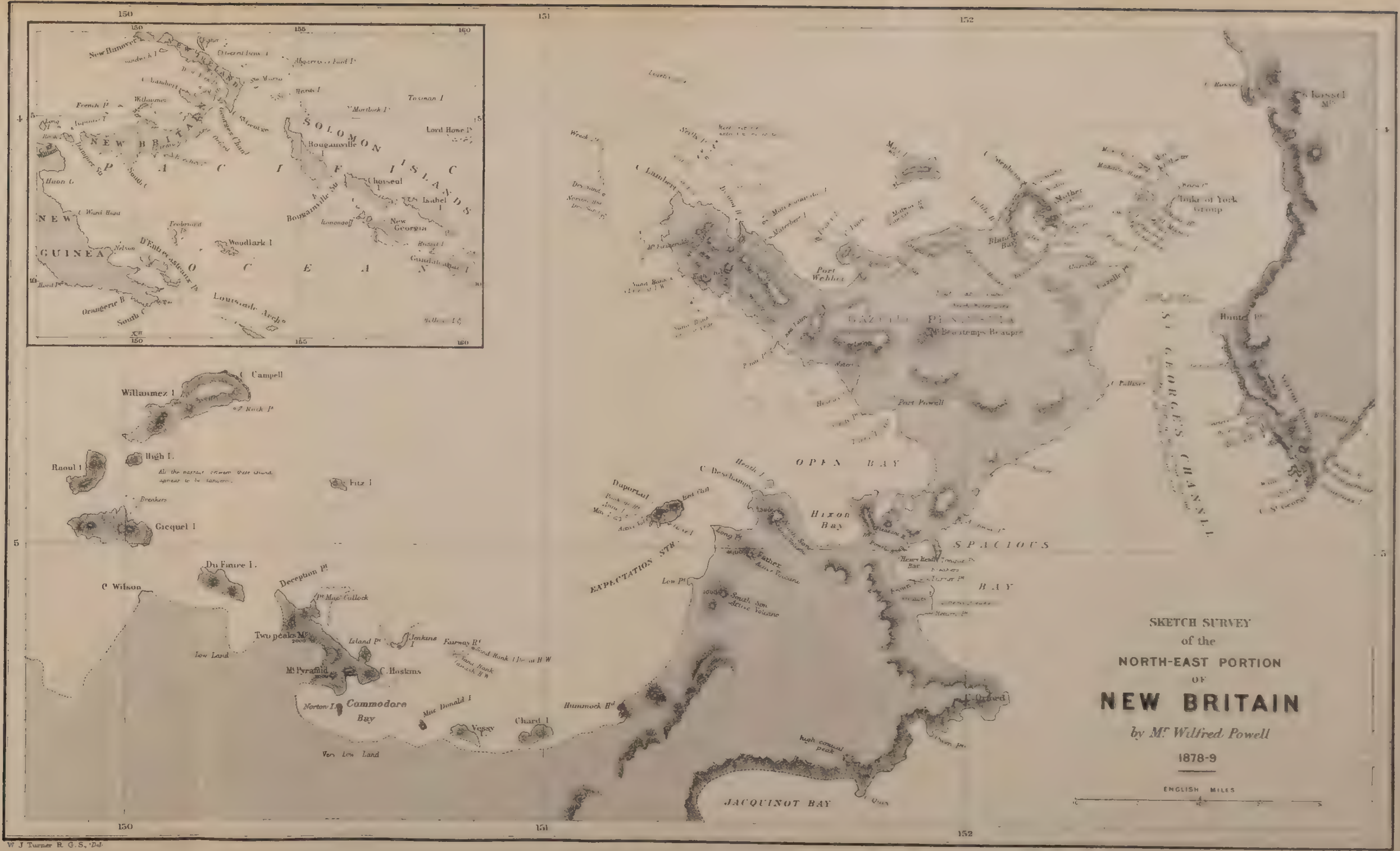
Society for Promoting Christian Knowledge.—Map of the British Isles, published under the direction of the Committee of General Literature and Education appointed by the Society for Promoting Christian Knowledge, and of the National Society. Scale 1 : 1,080,000, or 15 geographical miles to an inch. Stanford, London. 1880. 2 sheets, price 7*s.* 6*d.*

—— Map of England and Wales, published under the direction of the Committee of General Literature and Education appointed by the Society for Promoting Christian Knowledge, and of the National Society. Scale 1 : 650,000, or 8·8 geographical miles to an inch. Stanford, London. 1880. 2 sheets, price 7*s.* 6*d.*

Spruner, Dr. K. v.—Historisch-geographischer Schul-Atlas. (Mittelalter und neuere Zeit). 23 colorirte Karten in Kupferstich. 10 Auflage 1880. Justus Perthes, Gotha. Price 9*s.* (*Dulau.*)

Steinhauser, A.—Steinhauser's erste Schul-Wandkarte der Gesammten Alpen. Mit Nachträgen an Eisenbahnen, sowie Ergänzung der sehr zahlreichen Höhenangaben in Meter. (Zulässig erklärt laut Ministerial-Erlass vom 22 September 1877, Z. 14,259.) Scale 1 : 500,000 or 6·8 geographical miles to an inch. Artaria & Co., Vienna, 1880. 9 sheets. Price 14*s.* 9*d.* (*Dulau.*)

Vereecke, Lieut. A.—La Belgique en relief. Dressée par le Lieutenant A. Vereecke, Adjoint à la Direction de la Brigade Topographique du Génie. Publiée par Merzbach & Falk, éditeurs. Institut Géographique de Bruxelles, 1880. Scales: horizontal, 1:800,000; vertical, 1:160,000. Price 4*s.* 2*d.* (*Dulau.*)



SKETCH SURVEY
of the
NORTH-EAST PORTION
OF
NEW BRITAIN
by Mr. Wilfred Powell
1878-9

W. J. Turner R. G. S. Del.

Pub^d for the Proceedings of the Royal Geographical Society

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Voyage of the 'Eira' and Mr. Leigh Smith's Arctic Discoveries in 1880.

By C. R. Markham, C.B., F.R.S., Secretary R.G.S.

(Read at the Evening Meeting, January 17th, 1881.)

Map, p. 192.

The Arctic Expedition undertaken by Mr. Leigh Smith, during the summer of last year, has met with unparalleled success. The discovery of a navigable route to Franz-Josef Land, and of the coast trending westward and then northward, will in all probability open a new era in the history of Polar discovery.

Mr. Leigh Smith has always been of opinion that discoveries are to be made, in the icy seas, by perseverance, and by watching for and promptly seizing opportunities. Accordingly, his plan this year was to make a general examination of the ice over a wide area, to ascertain the character of the season, and then, guided by the indications, to make an attempt in the direction which appeared to be most promising.

He caused a steam vessel to be built at Peterhead last winter, suitable for ice navigation, which was named the *Eira*. She is 360 tons burden, builders' measurement (260 gross register, 180 net register), and 50 horse-power (125 feet long by 25 feet beam). Captain David Gray, the well-known commander of the Peterhead whaler *Hope*, afforded valuable assistance in helping to draw up the specification, and in watching the progress of the work. The *Eira* was manned by twenty-five souls, all told. The gallant little band of explorers consisted of Mr. Leigh Smith himself; Mr. W. G. A. Grant, who had made three previous voyages to the Arctic Seas; Dr. Neale, the surgeon; Captain Lofley, of Hull, the master; two mates, two engineers, and seventeen men. At Lerwick, which place they reached on June 20th, four Shetlanders completed the complement.

The first thing that was projected, was a visit to and thorough examination of the interesting island of Jan Mayen, and of its lofty peak of Beerenberg. But unluckily the place, as is so often the case, was enveloped in mist; and Mr. Leigh Smith proceeded to his next work, which was an examination of the west ice, with a view to ascertaining whether it would be possible to explore any part of the east coast of Greenland.

On the 1st of July they were sailing or steaming through loose ice in a north-east direction all day; and they persevered for ten days, but found it impossible to reach the Greenland coast. During this time the *Eira* had gone at least 140 miles through the ice, though she probably did not get more than 70 miles within the pack. At last the attempt was given up, and a course was shaped for the northern point of the west coast of Spitzbergen. On July 11th the *Eira* fell in with the *Eclipse* and *Hope*, whalers of Peterhead, commanded by those well-known and enterprising captains, David and John Gray. These experienced navigators reported that the ice was low down along the north coast of Spitzbergen, and that there was little chance of making progress in that direction.

The land of Spitzbergen was sighted on the 14th of July, but the report of the Grays was confirmed by the ice itself, and it was clear that there was nothing to be done north of Spitzbergen. So, after a visit to Amsterdam Island and Smeerenburg, and a stay of three days in Magdalena Bay, the *Eira's* head was turned southwards. On July 31st the south point of Spitzbergen was rounded, and then commenced the serious attempt to advance northward across the Barents Sea to the coast of Franz-Josef Land.

Here was the great problem waiting for final solution. Is there a practicable route across this ice-laden Barents Sea? Several explorers had reconnoitred the ice, and had declared that, for steamers, there is a practicable route. In 1871 the gallant Austrians, Payer and Weyprecht, reached a latitude of 78° 48′ N. on September 1st, and could see no serious impediment. In 1878 the Dutch, under De Bruyne and Koolemans Beynen, reached 78° 17′ N. on the 7th of September; and in 1879 De Bruyne actually sighted Franz-Josef Land on the meridian of (?) 55° 12′ E. In 1879, also, Captain Markham, in the little cutter *Isbjörn*, made a push northwards, and sighted ice in 78° N. on the 12th of September. Sailing for 25 miles through ice, the latitude of 78° 24′ N. was reached, and no floes were seen, only broken-up ice. Captain Markham was decidedly of opinion that a steamer could have pushed through any ice that he saw, with little difficulty, and that, with steam power, the coast of Franz-Josef Land could be reached, during August or September, almost every year.

The correctness of Captain Markham's opinion was now to be tested. The *Eira* proceeded northwards, on a more eastern meridian, and a month earlier in the season. On the 6th of August she came upon the pack in about lat. 77° 10′, long. 40° E. Steaming along the floe edge to the northward, they were in 79° 4′ N. at noon on August 8th, and a few hours later made fast to a hummocky floe. Near them a large iceberg was grounded, the first they had seen in this direction. The depth was 48 fathoms, and the height of the berg, by aneroid, 200 feet. On the 9th, Mr. Smith continued to push into the pack, amongst heavy hummocky ice, with dense fog, and reached 79° 35′ N.; but on the following day it became advisable to work southwards again, to get clear. A gale of wind drove them far to the south, but on the 13th it had moderated, and at noon they were in 78° 18′ N., and on the meridian of 49° 10′ E. Steering north-east, and steaming about six knots, the *Eira* sighted land at eight in the morning of the 14th of August, on about the 54th meridian east of Greenwich. A more northerly course was now taken, and at four in the afternoon the ship was made fast to a piece of land floe attached to a small island, which was named May Island, after Captain W. W. May, R.N., an old Arctic officer. Franz-Josef Land was reached! The problem was solved, and the route was proved to be easily navigable, which will surely lead future explorers to new and important discoveries in the far north.

During the day they had passed through some loose ice, and by many bergs. These icebergs were very large and, as a rule, quite unlike those met with in Davis Straits and Baffin's Bay. The latter are generally angular and peaked, while those of Franz-Josef Land are nearly all vast masses, and quite flat on the top, like the bergs of the Antarctic Regions The average height above the water is from 150 to 250 feet. Payer says that he saw many, off Franz-Josef Land, which measured 220 feet.*

Several walrus were seen on some ice to the eastward, and Mr. Leigh Smith, with Captain Lofley and the Doctor went in chase, while Mr. Grant and the Shetlander, Peter, landed and climbed to the summit of the island, a height of some 200 feet. It proved to be a mass of basalt. The scene was desolate, but very grand. Below them lay the ship anchored to the floe, and far away in the distance the walrus boats could be seen. To the north was the coast of land to the west of M'Clintock Island, since named after Sir Joseph Hooker, enveloped in mist, with loose ice floating through the intervening strait. It was calm, and all was still until the silence was broken by the ivory gulls (*Pagophila eburnea*) which Peter had disturbed on their nests. Seven of them were taken alive, of which one survives, and is now in the Zoological Gardens. They had built near the top of a low basaltic cliff, and the young ones were tilted out of their nests on to the snow beneath. On this island there was a quantity of drift-wood, and one very large stem of a tree. During the day seventeen walruses were captured, and many more might easily have been taken.

Next day the ice closed in round the island, and the *Eira* anchored to a very large floe—so large, indeed, that they could not see across it from the crow's nest—some 10 miles south of their previous anchorage.

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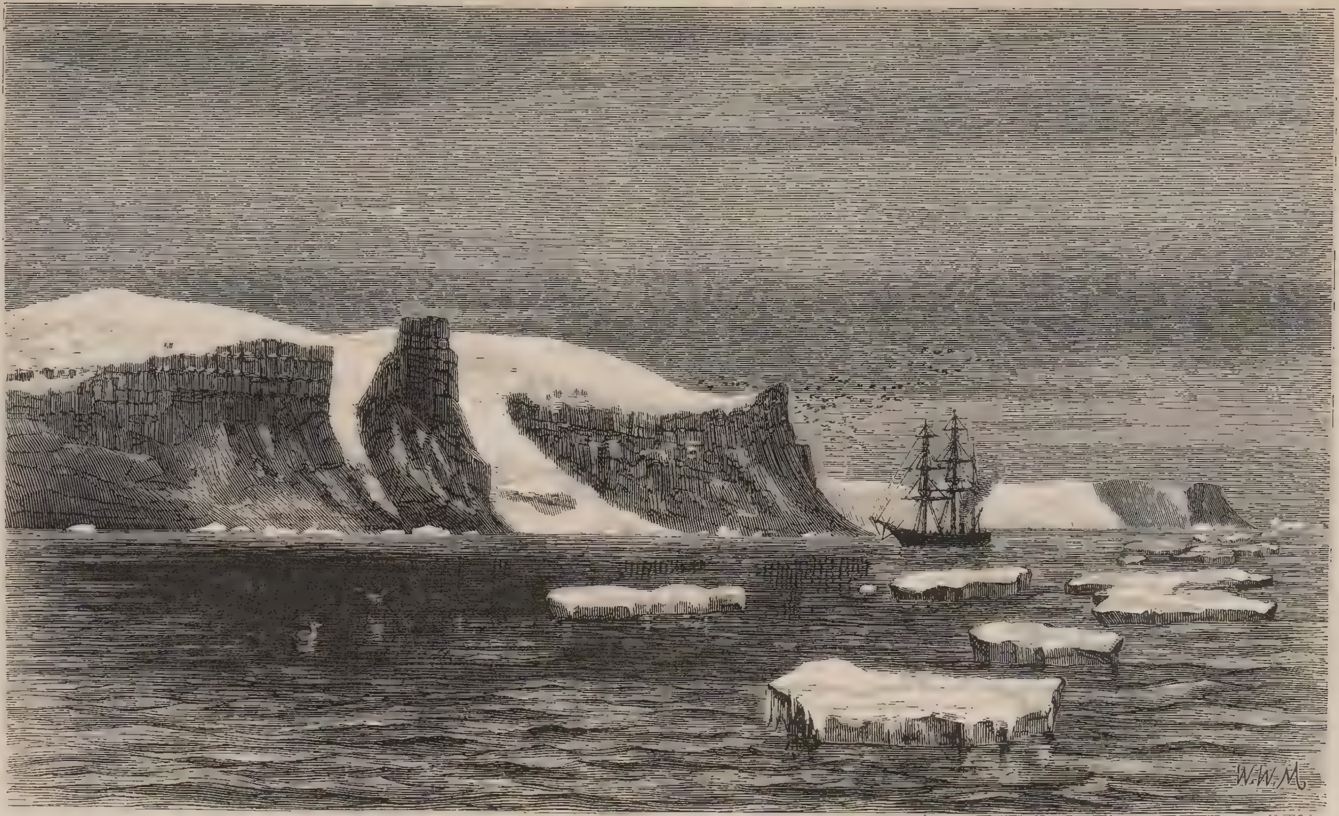
* I. p. 16.

On the 16th, at four in the afternoon, the *Eira* was off a long island to the westward of the ivory gulls' roost, named Etheridge Island, after the President of the Geological Society. Mr. Leigh Smith, and Grant, with the Doctor and a boatswain, landed, after hauling their boat on the ice, and climbed to the summit for a round of angles, depositing a record. But as they were coming down again towards the shore, they saw their boat, which had been hauled up on the ice, quickly drifting away. They observed that the piece of ice was drifting towards another point of loose ice, and that if they could reach it in time, they might yet secure their boat. There was a long stretch of ice to run over; moreover, ice hummocks and berg pieces hid them from the ship at the time, so that if they had not been able to get to the boat, those on board would not have known what had become of them. However, when they had got to the end of the fast ice, they easily reached the boat by jumping from one piece of floating ice to another, and were soon on board the *Eira* again.

During the night of August 16th there was mist, with occasional snow squalls, the wind being strong from the east. But next morning the weather cleared up, and a grand spectacle presented itself. This was no less than a fight between a large floe and an iceberg. Generally a floe will break off at the edge when it comes into collision with a berg, and in many instances, if the floe is not thick, a berg will force its way right through, cutting and tearing up the ice as it moves along. In the present case, the floe simply hove up the iceberg, and sent the huge mass right over. No one can imagine the power of ice without beholding its effects.

After steaming right round Etheridge Island, to avoid the ice the *Eira* proceeded through the mist towards the point, which was named Barents Hook by the Dutch in the previous year. It is supposed to be the extreme western point that they saw when they sighted Franz-Josef Land on September 7th, 1879. Here there is a remarkable formation of columnar basalt, like the Giant's Causeway. Passing Barents Hook at half-past six in the evening, the *Eira* commenced the discovery and exploration of entirely new land. During the night Mr. Leigh Smith and Mr. Grant went on shore, and walked along the coast to the westward until the way was blocked by a glacier. The coast-line consists of glaciers, with dark frowning cliffs at intervals, about 1200 feet high, and flat topped. On the slopes, formed by the crumbling and splitting away of rock from above, there was soil where grasses and various Arctic plants were growing. Mosses were especially abundant in the low swampy ground below the cliffs.

On the 18th they continued to steam westward, and, rounding the point of an island, they found themselves in a snug harbour formed by two islands, where there was good holding ground in five to seven



CAPE CROWTHER, FRANZ-JOSEF LAND.

[To face page 132.

fathoms. This place received the appropriate name of "Eira Harbour" (80° 4′ N., 48° 40′ E.). To the north of the anchorage there were high cliffs forming a huge amphitheatre, below which was a flat plain about a mile long and 600 or 700 yards in width. In some parts it was hard and solid as if paved, in others soft and mossy. The cliff to the eastward was a capital landmark for any one entering the harbour, as it was surmounted by basaltic peaks, and was, in fact, the only land, with anything like a peak, along the whole coast. Under this cliff, and on the steep slope descending to the plain, there were many plants, including a good deal of coarse grass; while just above the slope, among the rocks, there was a rookery of little auks or *rotjes*. The island to the south of the harbour is quite flat, except at the south-eastern extremity, where there is a hill 1400 feet high. On its south slope some plants were growing, otherwise this southern island appeared to be devoid of vegetation. It was named Bell Island, from the shape of the hill on it.

In the morning of the 20th three bears were seen on the shore, a mother and two cubs, slowly wandering about and sniffing the sand. An empty box had been left on shore, and they were seen walking round and examining it. They did not seem to take any notice of the ship. The plan of attack was soon arranged. Two boats were lowered, one remaining to the left of the bears a little off shore, while the other rowed away to land the attacking party at some distance. After landing, the assailants walked towards the bears, and, as their backs were turned, they easily got pretty close. As soon, however, as they saw their enemies, all three bears made a rush to the water. This sealed their fate. They were doomed, the mother to death, and her two children to an aimless life of inactivity at the Zoological Gardens. The two boats closed in; a shot through the head ended the life of the mother, and saved her from witnessing the degrading spectacle which followed. The men made quick work of the affair. The boats closed in with the young bears between them, and in a very short time each boat had a bear to tow it back to the ship. When they arrived alongside, the ropes passed round their bodies were handed up on deck, and the cubs soon followed. Casks were procured, the ends of the ropes were passed through the bung-holes from inside, and the bears hauled in, amidst much growling and snarling. The blacksmith then secured iron bars across the heads, and the casks were lashed on each side of the deck, where they remained until the ship arrived at Peterhead. The bears were always more or less noisy, except in bad weather, and they never got tame.

On the 21st, Mr. Leigh Smith, wishing to explore the neighbourhood of Eira Harbour, got under weigh, and started up a fiord to the westward, apparently a continuation of the Markham Sound of Payer, seeing many walruses. Continuing up the fiord, a point was reached whence a view was obtained of an opening to the eastward, and the place was seen where the *Eira* was anchored on the 14th. This portion of the land was thus proved to be an island. The channel was named after Captain *De Bruyne*, the leader of the Dutch Expedition of 1879; and the large island received the name of *Northbrook*, in honour of the late President of our Society, and present First Lord of the Admiralty.

In returning, an attempt was made to secure a young walrus alive. But the mother fought frantically, and guarded her offspring with such resolution that they were obliged to kill her, when the young one immediately decamped. Directly the mother is shot dead, the baby walrus always hurries away, but so long as the mother is alive, even if wounded, the young one remains by her. In this case there was a hard fight, and the boat reached the ship in a sinking condition, the walrus having made holes in it with her tusks, below the water-line.

After this little episode, the *Eira* was steered westward along the coast, towards the most distant point seen from the harbour. But she was stopped by pack ice at a point where there were great numbers of looms. Being unable to proceed further, they returned to Eira Harbour.

The scenery up the fiords was wild and desolate in the extreme. Nearly the whole coast-line was occupied by glacier after glacier rolling down to the sea. At long intervals, a black headland abruptly rose through the ice.

At noon of the 22nd, Mr. Grant went away for a long walk, and made a collection of plants, which, as a first instalment, partially illustrates the *flora* of this new region. His collection consists of nine species of flowering plants, two grasses, and a lichen. The former include the *Ranunculus nivalis*, a very common and widely distributed Arctic plant; the yellow poppy, *Papaver nudicaule*, which Dr. Brown called the hardiest of all the Arctic plants, and one of the most widely distributed; four saxifrages, *S. nivalis*, *S. cæspitosa*, *S. cernua*, and *S. oppositifolia*, a little *Stellaria*, the *Cerastium alpinum*, and the scurvy grass, *Cochlearia fenestrata*. The two grasses were *Alopecurus alpinus* and *Poa flexuosa*, the lichen *Peltidea aphthosa*. All these flowering plants and grasses also belong to Greenland, and all were also collected by the Arctic Expedition of 1875–76 up and beyond Smith Sound. All, except the *Stellaria*, were collected by Captain Markham in Novaya Zemlya. So that they belong to widely spread Arctic species. Three of them (*S. oppositifolia*, *Cerastium alpinum*, and *Papaver nudicaule*) are mentioned by Lieutenant Payer, as having been seen by him.

Mr. Grant walked along the shore to the eastward until finally stopped by a glacier. There was a regular beach, and a good deal of drift-wood, including a spar 8 feet long, which had evidently belonged to some ship. There were also the backbones and jaws of two whales. In the evening a party accompanied Mr. Grant to the summit of the hill overhanging the harbour, which proved to be 1040 feet above the sea (by aneroid). On the slope of this hill a good deal of petrified wood was collected, and some other fossils.

W. J. WELCH SC.
W.W.M.

THE LAND-ICE NEAR CAPE NEALE, FRANZ-JOSEF LAND.

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The lowest rocks belong to the Oxford clay, and are represented, in the collection brought home in the *Eira*, by two belemnites. Above the Oxford clay the rock is of the cretaceous period, to which the fossil coniferous wood belongs, including one very perfect cone. There are also slabs with impressions of plants. Over all there has been an overflow of basalt and lava forming a cap, as on the island of Disco. The collection of fossils brought home by Captain Markham from Novaya Zemlya, proved the existence of carboniferous rocks there, which dip under the more recent formations of Franz-Josef Island. Exactly the same carboniferous fossils were found by Sir George Nares's Expedition at Cape Joseph Henry; and these discoveries point to the probable existence of a carboniferous series of rocks in the unknown region nearer the Pole, on which the cretaceous rocks of Franz-Josef Land are resting. The complete geological examination of the unknown region is one out of many important results to be derived from further Polar discovery. The view from the top of the hill showed that there was extensive pack to the south and south-west, but none in the immediate neighbourhood of the harbour. The prospect was very fine. To the south the open sea, while to east and west extended snow-capped capes and headlands, and to the north was an interminable glacier.

On the 24th another attempt, this time a successful one, was made to round the western headland, now called Cape Grant. The *Eira* steamed away full speed, and, after passing through a belt of loose ice, a fresh headland opened out beyond the furthest hitherto seen, and was named Cape Crowther, after the mate of the *Eira*. Soon afterwards another came in sight, bearing north-west about 12 miles, named Cape Neale; and at 9 P.M. they were stopped by ice, and anchored to a large floe. Thence the land was seen trending away north-west. The furthest point seen, being over 40 miles away, was named Cape Lofley. The furthest position reached by the ship was in 80° 19′ N. lat. and 44° 52′ E. long. It then became dull, with mist and snow, the wind being strong from the north-west. The tide seemed to be running to the west.

The extent of new coast-line discovered and explored was 110 miles, while with the extent seen to the most distant point it was at least 150. The most western extreme of the south coast was reached, and it was ascertained that the coast trended thence in a north-westerly direction for an unknown distance. But the great size of the icebergs, and the extent of glacier, are indications that Franz-Josef Land is of vast extent, possibly almost continental in its proportions.

The night of the 24th was wild, and the scene was very dismal. Peering through the snow and mist were two or three bergs, and the desolate land to the north and east. The *Eira* was anchored to a floe, which drifted slowly in a southerly direction. Next morning they cast off, passed a small island at the western entrance of a large bay—

since named Gray Bay, and steaming up the bay, anchored to a land floe near the head of it. This great bay was surrounded nearly on all sides by glaciers, and was frequented by many saddle-back seals and walruses. While the men were flinching some walruses about two miles from the ship, a sound was suddenly heard as though a whole battery of artillery had opened fire at once. On looking up, they saw that a large piece of the glacier at the head of the bay had broken off. The roaring continued for some time, and though the distance was between two and three miles, the whole floe began to crack up all round them. The same thing happened where Mr. Leigh Smith was standing, near the floe edge. They could see the huge mass of blue ice slowly rise and fall, until at last it found its floating level in the water; and all the time it was sending forth a series of resounding noises like thunder, making the water rise and fall in rolling waves, thus cracking and splitting the floe. Some foxes were seen on the shore of this bay, and ivory gulls nesting on a cliff.

On the 26th and 27th a furious gale was blowing from the N.N.W. with much snow; and on the 28th, when it was still strong, but moderating, they steamed slowly eastward along the coast. In passing out of the bay, two right whales were seen, one of great size. On approaching Eira Harbour it was found that, in their absence, it had become full of drift ice; so the ship continued her course eastwards until an anchorage was found in a small bay formed by two glacier points a little to the west of Cape Barents. The gale continued to blow with great violence until midnight, but it moderated towards morning, and the anchor was weighed. Proceeding eastward, it was found that M'Clintock and the off-lying islands were surrounded with ice. At 8 A.M. of the 30th the *Eira* was close under Cape Tegetthoff, with pack ice to the east and south. Coasting along Wilczek Island, where a cairn was seen, they arrived at the spot where the Austrian exploring ship was abandoned, fast locked in ice. Now there was open water on the same spot, though fast ice was seen to the eastward. The weather continued to be very threatening, so Mr. Leigh Smith resolved to take his farewell of Franz-Josef Land for this year, while it was yet possible, and to make an attempt to reach Wiche's Land, on the eastern side of Spitzbergen.

During the last two weeks of August he had explored the southern coast of Franz-Josef Land and its off-lying islands, landing at various points, ascertaining the general characteristics, and observing the physical aspects of the region, both at sea and on land, while Mr. Grant took numerous photographs, and made botanical and geological collections. A meteorological journal was also kept. Above all, the most western point of the south coast was reached, and it was ascertained that the land trended northwards for an unknown distance. There are several peculiarities which distinguish the newly discovered tract from other Arctic lands, and which render its further and more complete examination very desirable. Among these are the ice-caps on all the islands, the flat hill-tops which Payer compares with the *ambas* of Abyssinia, and the large flat-topped icebergs. A very important question also requires solution, and calls for further exploration, with reference to the direction of the drift of these bergs, which would appear to be to the northward.

An interesting collection of invertebrate animals was made in the sea which washes the coast of the newly discovered land. Mr. Leigh Smith has presented it to the British Museum. A notice of the Crustacea has just been published by Mr. Miers, in the 'Annals and Magazine of Natural History.' Among them there is a new genus of *Pycnogonida*, or sea spiders, a really very interesting form which has never been described before, and which Mr. Miers has named *Anomorhynchus Smithii*, after its discoverer. These sea spiders are found in the British seas, of very small size. The larger ones have been collected in the Kara Sea; but this new genus is peculiar to the sea of Franz-Josef Land. The collection of Polyzoa has been entrusted to Mr. S. O. Ridley, who will determine them, and the Mollusca were referred to Mr. E. A. Smith. The latter are all well-known Arctic forms, but they are, of course, interesting as coming from a new locality. Although Arctic forms are not so varied and numerous as those which frequent warmer regions, the study of their distribution with reference to currents, and other circumstances, is of great scientific importance.

Arctic exploration is distinguished not only for the variety and importance of its scientific results, but also for its practical utility. It has not only added to the sum of human knowledge, but it has also increased the wealth of those nations which have wisely engaged in it. The explorers of Hudson's Bay led the way to a lucrative fur trade; those of Spitzbergen, of Davis Strait, and Baffin's Bay opened up other great sources of wealth; and the discoverers of New Siberia enriched their countrymen by a trade in fossil ivory. Mr. Leigh Smith, in discovering the south-western coast of Franz-Josef Land, saw at least two right whales, and a sea abounding in other oil-yielding animals. As many as twenty-seven walruses were taken, and, if their capture had been the object of the voyage, many more could have been obtained. Great numbers of seals were also seen. The number of bears shot was thirteen. Like all other northern discoveries, those of Mr. Leigh Smith combine results of scientific interest and importance with practical utility.

It is not at all unlikely that the practical utility of Mr. Leigh Smith's discoveries may be demonstrated in the near future. The Norwegians have now been frequenting the walrus grounds of Spitzbergen and Novaya Zemlya for a considerable number of years, and there are distinct signs of those localities having been overworked. The hardy Norsemen will eagerly welcome a new region for walrus hunting, such as is offered by the southern shores of Franz-Josef Land; and even whalers may not improbably follow in the same direction. The only difficulty which may cause them to hesitate is the supposed obstruction of the approach, by ice floes. Explorers, by annual reconnaissances, will throw a flood of light on that question, and, as in so many other instances, Arctic discovery will prove to be not only important in increasing the sum of human knowledge, but also in opening up new sources of commercial industry.

There yet remained a short navigable period in September, and Mr. Leigh Smith devoted it to an attempt to reach Wiche's Land from the eastward.

Thomas Edge, while in command of a fleet belonging to the Muscovy Company in the year 1617, "discovered to the eastward of Spitzbergen, as far to the northward as 79°, an island which he named Wiche's Island," after Mr. Richard Wiche, one of the foremost of the merchant adventurers. It was never seen again until Mr. Birkbeck descried it on the horizon in 1864. Von Heuglin, in 1870, climbed a high hill on Edge's Island, the south-eastern of the Spitzbergen group, and sighted it. He improperly gave a new name—King Karl Land—to an island which had been discovered and named by Captain Edge 253 years before, and sighted by Mr. Birkbeck six years previously. But neither Birkbeck nor Von Heuglin reached it. This feat was reserved for the Norwegian captains Altmann, Johnsen, and Nilsen, who, in the summer of 1872, found the sea on the eastern side of Spitzbergen freer from ice than it had been known for twenty years. Generally the eastern side of Spitzbergen is believed to be closely packed with ice, and Mr. Leigh Smith did another useful piece of service to geography in examining the eastern edge of the pack in this direction.

From the 1st to the 10th of September search was made by him for an opening in the ice, so as to proceed westward in the direction of Wiche's Island. During the whole time the *Eira* was kept pretty close to the pack, following it right down to 75° 30′ N. on the meridian of 46½°. The pack was very close. Several times they thought they had found an opening, but it always turned out to be a deep bight; and on the 10th they were off Hope Island. The weather now became very bad, mists with strong gales, and the nights were getting dark. A course was therefore shaped for Stor Fjord, in the south of Spitzbergen, and steaming right up it, the *Eira* was anchored in Genevra Bay on the 17th of September. Next morning was lovely, and, climbing up a hill, the explorers got a view of Wiche's Island in the far distance, and no intervening floe ice visible, though there were many bergs.

On the 20th a strong west wind sprang up, and the *Eira* steamed southwards towards Walter Thymen's Straits, anchoring at Lee's Foreland. There are numerous rocks and reefs off Walter Thymen's Straits, which are not shown on the Admiralty Chart. In fact, the chart is very inaccurate, and there are many places, which are frequented by vessels every year, that are quite incorrectly laid down. On the 22nd the voyage home was commenced, and on the 24th the *Eira* reached Hammerfest, where a pilot was taken on board. There was a heavy sea, and the ship rolled so much that the pilot could not come on board in the usual way. So he made himself fast to a rope that was thrown to him, jumped from his boat into the sea, and allowed himself to be hauled on board like a sack of potatoes.

At Hammerfest some vessels were at anchor, which had been engaged in attempts to reach the Yenisei. It had not been a favourable year. The *Dahlmann* and *Luise* had in vain attempted all the straits leading into the Kara Sea, and had even been round the northern extremity of Novaya Zemlya, but without success. The *Neptune* had, however, been more fortunate. She arrived at Hammerfest with a full cargo of wheat and rye from the Obi.

Captain Dahlmann was convinced that a vessel properly constructed for ice navigation, like the *Eira*, could reach the mouths of the Obi and Yenisei every year, and make the trade a certainty. But if merchants persist in sending unsuitable iron vessels, unprepared for meeting the ice, they must expect failure. To this reason alone is the failure of steamers to reach the Yenisei, in 1879 and 1880, to be attributed.

The *Eira*, while in charge of a pilot, had the misfortune to run on a rock near the anchorage of Govesholmen. Luckily it was fine weather, and she was hauled off by the *Nordstjernen*, a powerful Norwegian mail-boat. On October 5th they anchored at Bodö, and sailing on the 7th, reached the Shetlands on the 11th. The Shetland portion of the crew was landed at Lerwick, and Peterhead was reached on the 12th of October.

Thus ended this memorable and most successful cruise. The crew of the *Eira* behaved admirably throughout, displaying much zeal, and fully entering into the spirit of the enterprise.

The voyage of the *Eira* must be pronounced to have been the most important summer cruise that has ever been made in the Arctic Regions. Mr. Leigh Smith's discoveries in 1880 will form a fresh starting-point for future Polar discovery; and they thus open a new and, let us hope, a brilliant and fruitful chapter in the glorious history of Arctic Exploration.

Course of the 'Eira,' and Meteorological Notes of the Voyage; Extracts from Mr. Grant's Journal.

June 28*th*, 1880.—In sight of Jan Mayen; passed ice, and ice encircles the land; it is very low this year. In 1878 (in the *Willem Barents*) we saw none at all. Weather beautiful.

June 29*th*.—Anchored off the bay between Egg Island and the next point E.; in the afternoon had to clear out quickly as the ice was coming rapidly into the bay. We steamed out through loose ice to the N.E., where we found the main pack, and had to go in a south-easterly direction and steam hard all night to get clear and avoid being beset. Mist.

June 30th.—All night working through loose ice, and we had to work a good deal to eastwards before we could clear a point of the main pack. The ice here is certainly very low this year; in 1878 we saw no ice at Jan Mayen, and met it much higher to the N.E. At 9 P.M. we are steering in a more north-easterly direction along the pack edge and through very loose small ice. Mist.

July 1st.—All day steaming and sailing through loose ice in a north-easterly direction; wind northerly; sea-water temperature above 33° F.; air 34°·5. Mist.

July 2nd and 3rd.—Light north-easterly breeze on 2nd; nearly calm on 3rd. We were in a deep bight in the ice, steaming from one piece of ice to another and dodging about. We were several miles in the ice among loose detached floes, which would soon close up and form into a pack, and on night of 3rd made for the open water again, and lay at the edge of the ice all night. Weather very beautiful.

July 4th.—Wind from W.; sailed towards the N. Mist and fog.

July 5th.—Fresh W. wind. In about meridian of Greenwich, and hope to-morrow to be in lat. 75°. Fog.

July 6th.—Sailed N. and then steered N.W. a bit till we reached the ice edge again, then stationary, drifting at the edge. Fog. Temperature of air about 35°, but at night falls to about 32°.

July 7th.—Still drifting about, until 1 P.M., then steamed half speed in a north-westerly direction, dodging about among the loose floes. Fog.

July 8th.—Full speed ahead through fog and among ice till 2 A.M., then anchored to a large floe; weather cleared, and plenty of ice seen, but of a loose description. As a rule, the floes are flat and not hummocky. At 8.30 A.M. steamed off in a westerly direction; weather thick again. At 10.45 A.M. anchored to a very large floe. Wind sprang up from N. Soon after 2 P.M. left the floe, and continued edging on towards the land. We are a long way in the ice now, must be a good bit more than 100 miles. 10 P.M.; the ice is closer now, and the floes very large, leaving only lanes of water between. Going full speed ahead.

July 9th.—Steamed onwards till 4 A.M., when we made fast to a floe again. At 9 A.M. start off again. Weather clear. Ice much more hummocky. Soon after noon anchored to a large field of ice. At 4 P.M. started again through narrow lanes of water, working northwards. Weather lovely. Position at noon 76° 12′ N. lat., 5° 50′ W. long.; about 70 miles in the pack. At 10 P.M. anchored to floe as fog came on again.

July 10th.—Thick fog until 2 P.M., then steamed S.E. through easy sailing ice and big pools. In the afternoon ceased steaming, and sailed in a northerly direction through loose ice. Mist.

July 11th.—At 8 A.M. commenced steaming again, as the wind died away, and then came lightly from N. Weather foggy, with tendency to clear at times. Ice loose and generally in small lumps. Worked on northwards all the afternoon, and at 7 P.M. sighted the *Eclipse* and *Hope.*

July 12th.—Morning foggy. At noon all three went N. a bit. At 3 P.M. anchored at a big floe. We learnt from the whalers that the ice is far down Spitzbergen this year. At 6 P.M. a snow-storm came on, and continued well into the next morning.

July 13th.—Parted with the whalers at 8 A.M. Throughout the day have been sailing N., through loose ice; hardly any wind. Mist until well into the afternoon; fine calm night.

July 14th.—Morning fair; very fine from 4 P.M. till midnight; sea calm. In the afternoon got out of the ice and steamed along edge in a N. and N.E. direction, and at 8.30 P.M. sighted land, being most likely Prince Charles Foreland, some 100 miles off. There is right ahead of us a long point of ice, which may perhaps extend to the land. In 1878 there was nothing like so much ice out here.

July 15*th.*—Bright clear day; wind light. Ice running in bights and seems pretty near the land ahead. At 8 P.M. we were steering towards the N.W. point of Spitzbergen. Ice to W. packed.

July 16*th.*—Misty morning, but afterwards better. Were dodging along ice edge and across bights, and in the afternoon were nearing Amsterdam Island. Had a fresh southerly breeze. About 8 P.M. Cloven Cliff bore due S. as we were steering E., and 5 miles off. We are some 28 miles from Moffen Island, and though there does not seem to be much ice as far as we can see to the E., there is a good deal to the N., and it seems heavy and closely packed. At 10.30 P.M. fog came on quite thick, and we had to stop.

July 17*th.*—Fog cleared a bit at about 1 A.M. At 8 A.M. bored into loose ice, which was however pretty close together, and remained stuck in it till past noon, then made towards Welcome Point, and anchored at 6 P.M. to the land ice off Red Beach. The fast land ice was mostly piled up in small hummocks, and was quite tight and solid, caused by great pressure.

July 18*th.*—Morning bright. We could not get N. in this direction; so at noon we steamed off, and at 8 P.M. anchored at Amsterdam Island. After leaving the ice a gale of wind from the S.W. came on, and we had a hard job to steam against it. Wind too high to land.

July 19*th.*—Noon, weather more gloomy, wind still high, and continued blowing hard all night.

July 20*th.*—At 1.30 P.M. weighed, and made for Fair Haven; weather seems to be getting fine again. We could not get to an anchorage as the ice was fast and jammed tight in between the islands and on to the land. This is most unusual, and seldom happens here at this time of the year. Wind still strong from S., so steamed back to our former anchorage.

July 21*st.*—Weather very fine. Ice coming down fast and lying from W.S.W. towards the N.

July 22*nd.*—At 10.30 A.M. weighed and proceeded out of South Gat, a good swell on. Ice right down on Danes Island and the rocks on the S. point. Kobbe Bay quite closed. A passage southwards, but seems to be ice towards the S. too. We steamed, but finding a gale of wind blowing and nasty sea on, from the S., we made into Magdalena Bay and anchored. Blew hard all night; high sea from S. Ice now packed and shutting in South Gat.

July 23*rd.*—All morning fine overhead, but gale as hard as ever. From 6 P.M. till next morning, mist and drizzle.

July 24*th.*—Bright sun, but wind blowing from S. as hard as ever. No ice seen to W. A good deal of ice had gone into Smeerenburg Bay. Evening cloudy, and wind in hard gusts. Air temperature about 50° F.

July 25*th.*—Morning misty; wind evidently less. At 7 P.M. weighed, and proceeded out to sea under topsails, jib, &c., edging westward away from the shore.

July 26*th.*—Morning foggy. Sailed S., passing the N. head of Prince Charles Foreland in the afternoon, some 5 miles E. At 5 P.M. weather fine. Wind all day from N. Sea moderate.

July 27*th.*—Soon after midnight the breeze died away, and we remained stationary some 10 miles off Prince Charles Foreland. Afternoon very fine. At 5 P.M. a breeze sprang up from S.E., and continued up to midnight from E.

July 28*th.*—Off Bel Sound. Morning calm. Weather fine and warm. Very light breeze at night.

July 29th.—Calm. Weather warm and pleasant.

July 30th.—Off Horn Sound in the afternoon. It became misty before noon, and soon after we had a thick fog which lasted all night; no wind. At 10.30 A.M. till 3.30 P.M. steamed S.E. towards South Cape, then stopped as fog was so thick. At 8.30 P.M. started again, and by 11 P.M. were off the Cape. Wind inclined to come a little from N.W.

July 31st.—Rounded South Cape at midnight. At 10 A.M. steamed E. At noon met a little loose ice, and towards Hope Island it gradually became closer, till at 9 P.M. we were stopped, as the ice ahead was packed, and so we had to steam S.W. Weather lovely; clear and calm. Hope Island about 25 miles off.

August 1st.—Mist and fog all day. Have been steaming through loose ice, and along edge of pack and across bights all day, mostly in a S.E. direction, and often southerly to clear point ends of ice. Weather cleared at midnight; open water to S.

Aug. 2nd.—From 4 A.M. till 2.30 P.M. steered an easterly course. Ice N. of us, open water S. At 2.30 made N. again under sail, steering N.N.E., but at 8 P.M. had to tack and go S.S.E., as ice again ahead. Weather very fine all day.

Aug. 3rd.—Strong wind from N.E.; a nasty sea; very thick fog. Cleared just before midnight, and sea went down. Lat. at noon 75° 19′ N. Course S.S.E.

Aug. 4th.—Morning fine. Course E.N.E. In afternoon a very thick mist came on and continued up to midnight. Barometer 29·26, falling.

Aug. 5th.—Dense wet fog all day. Course N.E., with a south-westerly air. Position 75° 50′ N. lat., 34° 10′ E. long. Heavy swell from S.

Aug. 6th.—Fog all day until 11 P.M., when we came upon the pack again. At noon, position 76° 28′ N. lat., 37° 10′ E. long.; at midnight some 50 miles N.E. The pack bears N.W. of us, and point end is ahead.

Aug. 7th.—Mist all day; cleared at mid-day. Sailed N.E., with favourable wind, and got to 77° 14′ N. lat., 42° 30′ E. long. at noon. No ice. Wind more northerly, and a swell coming down from N., which gives us hope of getting towards Franz-Josef Land. At 7.30 P.M. the wind was N.N.W., and we steamed N.E. by N. Have seen several icebergs; saw none in the Barents Sea the last two years, except close up to Franz-Josef Land.

Aug. 8th.—At noon, position 79° 5′ N. lat., 45° 42′ E. long. At 4 P.M. anchored to a large hummocky floe. Since noon we have been through ice, large pieces but no great floes. Misty all day. The last two or three days the weather has been cold, 32° F., and at nights we have been having three or four degrees of frost. At 8.45 P.M. moved off from the floe; a large iceberg was grounded near us. Sounded, and got only 48 fathoms, mud and sand. At 10 P.M. anchored to a floe again. Sounded 90 fathoms. Thick fog. Ice all round. There seems to be a south-westerly current here. No wind; sea quite calm.

Aug. 9th.—At 1 A.M. commenced steaming again, northerly, boring through the ice in a lane between heavy hummocky pack. At 3 A.M. dense fog, and anchored to a large floe. Sounded 135 fathoms. Strong wind blowing outside from S.E. Driving northwards with the ice. Lat. 79° 35′, long. 46° 22′. Sounded 148 fathoms, mud.

Aug. 10th.—Fog as bad as ever, and ice closing in more. 11 A.M. sounded 155 fathoms, so must have drifted. Wind S.S.W. Drifting in north-easterly direction with the ice. At 6.30 P.M. the weather cleared a bit. Wind has been fresh from S.W. At 7 P.M. the sun came out, and we commenced to move, boring through the ice. To the N., E., and W. no water (not even pools) was visible, though to the S.E. a little could be seen. Towards the S.W. were lanes and patches of water, and we are now wending our way under steam in a zigzag course S., S.E., and S.W. All the floes we have seen were very heavy and of great thickness, quite unlike the loose and thin ice we met last year. Our highest point was 79° 40′; as soon as we left, the ice jammed up quickly. At midnight we are steering through a large pool and loose ice, S.E.

Aug. 11th.—Soon after midnight dense fog came on again, and continued all night and nearly all day with an occasional break. Tacked about the large pool, and at 8 P.M. broke into another pool, which may almost be open sea, as there is a good "lop" on. Wind strong from S.W. At 10 P.M. edging south-easterly to clear a long point-end of ice.

Aug. 12th.—Soon after midnight the wind and sea increased, and by 8 A.M. we had a gale blowing from S.W., which increased as the day wore on. We drove easterly and south-easterly for some time, as we had to lie to, and drifted a long way S. At 6 P.M. we wore ship, as we were drifting down on the pack, and so continued till midnight, when we again wore, having our head now N.

Aug. 13th.—All through the night the gale blew hard, but by 8 A.M. it had quite moderated, and we had bright sun all day. Position at noon, 78° 18′ N. lat., 49° 10′ E. long. At 3 P.M. we commenced steaming north-easterly. Wind from W.N.W.; sea much gone down. Steering all through the night N.E. by N. No ice in sight, only one berg.

Aug. 14th.—At 8 A.M. sighted land bearing roughly from N.W. to N.E. when we were in lat. 79° 14′ and about long. 54° 10′, so we steered a course more to the N.N.W., and by 4 P.M. made fast to a heavy piece of land floe attached to a small island (May Island). At 10 A.M. we passed through some loose ice and by many bergs. At noon we were in lat. 79° 47′. Some of the bergs met with here were very large, all immense masses, some several miles long, and quite flat on the tops. The average height above water might be from 150 to 250 feet or more. Between our anchorage and the land lay a mixture of loose ice and water. No wind. On the low part of the island there was a quantity of drift-wood.

Aug. 15th.—In the early morning a large floe and some loose ice were coming down on us and shutting us in, so we had to decamp, and never again were able to land on this particular island. The weather became bad, and a strong wind from the S.E. began to blow. At 2 P.M. we anchored to a very large floe running N. and S. It was miles in length, and we could not see across it. We were some 10 miles S. of our former position, which was now a mass of ice.

Aug. 16th.—At 8 A.M. commenced steaming towards the land again, and by noon anchored to another floe. Throughout the day the wind was rather strong from E.N.E. At 4 P.M. we were off a long island (Etheridge Island) to the W. of our first discovered island. Anchored and went ashore. A good view of land to the N.E., &c. To the S.W. of us was land and a cape (Cape Barents) we afterwards rounded. At 8 P.M. we had to move again, going a little towards the E., and anchored to a big floe off the island on which we had landed on the 14th. Sounded 70 fathoms. Mist and snow through the evening and night; wind strong from E. and E. by N. Drifting slowly.

Aug. 17th.—At 4 A.M. we had to shift our position to avoid being smashed up by a large flat berg against which our floe was driving. Between 4 and 8 A.M. the weather had quite cleared up. At 10 A.M. we moved from this floe, as the ice was coming down fast, and we had to steam right round the long island towards the west land, which appeared at the time to be free from ice. At 4 P.M. steaming S.W. to a cape (Barents), and after passing it at 6.30 P.M., steered westward along an entirely new land (Northbrook Island). We kept along the coast for some time, but as the mist became very thick we lay to, and when we had drifted a little to the W., we steamed back into position again.

Aug. 18th.—At 1.30 A.M. the mist cleared away. Went on shore. At 11 A.M. the sun came out; wind blew hard from S.E. We steamed towards land to W., and rounding an island (Bell Island), found ourselves in a snug harbour (Eira Harbour) formed by two islands. Anchored here at noon.

Aug. 19th.—At 9 A.M. there was a light northerly wind; at noon it was strong from E.N.E., and by 3 P.M. had greatly increased. At 6.30 P.M. the gale moderated and blew only in short gusts, and by 8 P.M. it was fine and quite quiet. By 9 P.M. it was again blowing a gale from E.N.E., but by midnight, though we still had it hard in squalls, the weather had greatly moderated, and in a few hours the gale changed into a light south-south-easterly breeze.

Aug. 20th.—Misty all day.

Aug. 21st.—Morning calm and pleasant. At 11 A.M. weighed anchor and started up a fiord (Nightingale Sound) to the W. of Eira Harbour in a N.E. and E.N.E. direction, and returned steering along the west land (Alexandra Land) until 9 P.M., when we were stopped by pack ice (off Cape Grant), so steamed back to Eira Harbour.

Aug. 22nd.—In harbour. Dull and misty all day; calm and warm.

Aug. 23rd.—Morning misty, but by noon the weather was fair. Went a cruise, this time entirely circumnavigating the two islands forming Eira Harbour. By 8.40 P.M. we were again at anchor. Mist and sleet in the evening; wind apparently from N.W.

Aug. 24th.—At 11.30 A.M. we steamed west. Fresh breeze from N.W. At 9 P.M. we anchored to a large floe off a headland (Cape Neale), quite unable to go further. Weather squally. From here we could see land trending away to the N.W., and the furthest point seen must have been over 40 miles off. Sounded 175 fathoms; no bottom. Wind strong from N.W. by N.; tide seemed to be running to the W. Drifting with the floe all night; plenty of water, however, to the E. of us.

Aug. 25th.—Still drifting with the ice in a southerly direction, but not fast. The morning was clearer. Sounded 175 fathoms; no bottom. Ice seemed to be coming down along the land, which drove us backwards with it, so at a little before 2 P.M. we cast off from the floe and commenced steaming towards the E. Wind N.W. by N., blowing fresh. Steamed up a bay (Gray Bay) and anchored to a land floe which filled up the head for about five miles.

Aug. 26th.—At 9.45 A.M. cast off from the floe. Wind S.S.E., with snow and mist. Up to noon we kept steaming full speed, head to wind. By 8 P.M. the gale had moderated, and we lay at the entrance to the bay. Barometer, 10 P.M., 28·54.

Aug. 27th.—At 2 A.M. a furious gale got up from N.N.W., and blew with great violence all the morning, which was spent in dodging bergs and keeping clear of the pack. At 12.15 P.M., after boring through a good deal of loose ice, we anchored to a floe.

Aug. 28th.—Wind was still strong, but not so violent, and still from the N.W. and N.N.W. At 4 A.M. we steamed slowly out of the ice towards Eira Harbour, along the coast. It had become full of drift ice, and we could not go in. Wind now became more northerly. At noon we passed the spot where we landed, on the 18th, near Cape Flora. Wind increased and blew again with great violence from N.W. by N. Anchored in a small bay a little to the W. of Cape Barents. Gale continued with great violence up to midnight.

Aug. 29th.—By 6 A.M. the weather was much better, and at 10 A.M. weighed anchor and steamed eastward. At 11.30 A.M. we came upon pack ice lying off the point, so had to steer S.S.E. There was now ice all round M'Clintock Island, and all the islands where we were were surrounded with ice. Wind N.; weather fine. At noon we began boring through some loose ice. At 2 P.M. steered N.E. At 4 P.M. commenced sailing in an E. and E.N.E. direction.

Aug. 30th.—At 8 A.M. came close under Cape Tegetthoff, about a mile off. At 9 A.M. mist came on and wind from W., but by noon from W.N.W., very unsteady and strong. There was pack ice to the E. and also to the S. We then coasted under the south-west corner of Wilczek Island, and were soon near the spot where the *Tegetthoff* was abandoned, but now there was water there, though fast ice (apparently) to the E. At 1 P.M. we were steaming and sailing, edging away from the pack. Pack ice E. and N.E.; ice, too, was filling in from the W. At 6 P.M. we headed S.W., and continued working in a west-south-westerly direction, keeping off the pack which was to leeward of us. At 10 P.M. we were among a great deal of loose ice, mostly composed of large and heavy pieces.

Aug. 31st.—Continued steaming and sailing all night towards the W.S.W. Soon after 10 A.M. we were again among ice. Wind light from S. Soon after noon we commenced sailing S.W. At 5 P.M. the wind had gone round to N.E. About 9 P.M. we lay to, having passed through plenty of loose ice and past many bergs, some very large. Mist. Barometer 28·94. Wind being a gale from N.E. by N., we lay driving, with the ship's head E. by S. There was a point of pack ice stretching from S. by E. to S.W. by W. as far as we could see.

September 1st to 16th.—Trying to go W., but could not find a single opening. For the first few days we had varying weather, mostly bad, and passed through a good deal of loose ice. The whole time we kept pretty close to the pack, always having it to W. of us. We followed the pack right down to lat. 75½°, long. 46½° E., before we could get at all to the W. On turning the corner on September 5th we were able to keep close to the pack, as the wind was nearly always from W.N.W. or N.W., and although at times it blew hard, there was seldom any loose ice away from the pack edges. There was no ice south of us. We steamed from point-end to point-end, and sometimes up a bight, hoping to get through, until we sighted Hope Island about midnight on September 9th. This night was extremely fine and calm. Next morning we steamed round the south-west corner of the island, and then steered a northerly and afterwards a north-easterly course. A fog soon came on, and we found ourselves before long among a quantity of small grounded icebergs, which we had to dodge. The next three or four days we had nothing but gales from S.W., W., and W.S.W., with high and rough seas; thick mist nearly all the time. We were finally driven right round the island, and at noon on the 14th were at the south-west of the island again, some 12 miles off. Steered across the mouth of Stor Fiord until we sighted the South Cape of Spitzbergen. Here we experienced stormy weather again. Coasted the west side of the fiord. Weather now fine.

Sept. 17th.—Anchored in Genevra Bay at 9 A.M. Morning lovely, blue sky and bright sun. No ice visible between Spitzbergen and Wiche's Land, though there were a good many bergs. Hinlopen Straits also seemed free from ice.

Sept. 18th.—By 8 A.M. a strong wind from N.E. had sprung up, and it was extremely cold.

Sept. 19th.—Weather lovely, quite calm, bright sun. Bay ice was making.

Sept. 20th.—During the night a strong W. wind sprung up. At 8 A.M. steamed southwards, and at 4 P.M. anchored at Lee's Foreland.

Sept. 21st.—A most perfect day.

Sept. 22nd.—At 3.15 A.M. weighed anchor and steamed S. At 8 P.M., from lat. 76° 56′, long. 19° 45′ E., we made a start with a light E.S.E. wind; soon we got a fresh E.N.E. gale. Mist.

Sept. 24th.—At 2 A.M. saw land; and at 2 P.M. anchored at Hammerfest.

Previous to the reading of the foregoing paper—

The PRESIDENT said that at the opening of the Session he had mentioned that the Council looked forward to a paper by Mr. Leigh Smith, giving an account of his very interesting discoveries in the Arctic Regions—not absolute discoveries as far as the region itself was concerned, but still a very considerable extension of our knowledge in that direction; and all the more remarkable as the expedition only occupied one summer season. In all probability those discoveries would lay the foundation for very enlarged knowledge of those regions, and for the possible prosecution of adventure in the direction of the North Pole to a greater extent than had hitherto been accomplished. He was sorry to say that Mr. Leigh Smith was suffering from temporary indisposition, and therefore was unable to attend the meeting; but, like many other brave and daring men, he was of a singularly modest disposition, so much so that he declined to write himself a narrative of his adventures, though he was willing to supply the fullest information as to his cruise. The duty of drawing up a paper on the subject had fallen into the very competent hands of Mr. Clements Markham. While the Meeting would regret the absence of the hero of the journey, still a paper gained something from being written and commented upon by another person, who could make remarks which the principal performer might shrink from making.

On its conclusion, the following discussion took place:—

Captain Sir GEORGE NARES said he had great pleasure in availing himself of this opportunity to bear testimony to the importance of the successful voyage which had been made by Mr. Leigh Smith. It should be remembered that this was not the first occasion on which that gentleman had visited the Arctic Regions, for he had followed up his explorations for many years. After gaining a thorough knowledge of ice navigation, he had finally made his push for Franz-Josef Land, and had come off successful. The great importance of his voyage would certainly be proved hereafter, because he had opened up what, according to present lights, must be the future route to the Pole. The expedition that he (Sir George Nares) commanded, effectually closed up Smith Sound as a route in that direction. The public, when he returned, were not particularly pleased with his report, but it was his duty to say that in that direction the Pole was impracticable. To all the officers and men who served in that expedition it would be a very great pleasure to find that a new route had been discovered. What was wanted was a base from which to start along the land northward. Hitherto the work in the direction of Franz-Josef Land had been carried on in small sailing craft, and now the first time that a steamer attempted to reach it, the attempt had proved successful, and Mr. Leigh Smith had arrived there practically without any trouble at all. The question now was, would it be possible to get there in future years. He thought it would be, but at the same time great caution was necessary in pronouncing judgment on other attempts. Even if Mr. Leigh Smith did not again start for that region, he was certain to have many followers in his footsteps, and if they did not prove so successful, no fault should be found with them. Ice navigation was not to be played with, and success was not always certain. From Payer's voyage it was learned that the Arctic migratory seabirds went to Franz-Josef Land earlier than to any other known spot. The precise reason for this had not yet been ascertained, but it afforded evidence that the water in the channels that Payer travelled over always thawed earlier in the summer than in other parts of the Arctic seas very much further south. This must be in consequence of some very strong current pouring through the strait represented on the chart, thawing the ice. He could not think that this current flowed from the south; if it did it would carry the ice towards the land, and there could not possibly be such a large quantity of water there. He therefore reasoned that the current came from the north, causing a large body of water close to the land by forcing the ice south; a vessel bound north would meet this ice at a distance from the land, and would have to force her way through it. Mr. Leigh Smith pushed through it both ways, and he had every hope that when an expedition started for Franz-Josef Land with the intention of wintering there, it would be able to reach its destination just as easily as Mr. Leigh Smith had done. There could be no doubt that the Kara Sea had, during the past year, been filled with larger quantities of ice than in several previous years, and it might be that a season in which a westerly wind prevailed and filled that sea with ice, was the most favourable for getting to Franz-Josef Land. Mr. Markham had referred to the heavy icebergs that were born there. What became of them was not known. If his conclusion about the northern current was correct, this, in combination with a movement towards the north-west of a lower stratum of warmer water, would carry them towards Wiche's Land, of which nothing was known. They were not found drifting down past Hope Island and Bear Island in any great quantities, and it was still uncertain where they went. The information given in the paper about the game likely to be met with, would be very valuable for future explorers, and although nothing had been said about reindeer, he did not see why they should not hereafter be met with. They were found in Spitzbergen in great numbers, and also in Novaya Zemlya. Nothing had as yet been said about any plains in Franz-Josef Land where the reindeer would be likely to congregate. Cliffs and glaciers stretching out into the sea did not form the kind of land in which such animals would be expected, and he lived in hopes that some day or other a district would be discovered in which plenty of game was to be obtained. Eira Harbour was a very important discovery. If a good base could be once established, expeditions might go on in confidence. The presence of bears and walrus was also important. Walrus were never seen where there was not a quantity of open water every year. Seal did not require so much, but the fact that they were seen as well as walrus was an indication of the periodical existence of an extensive body of open water. Bears would not go where they could not get seals to live upon, and thus there was every prospect that last year was not a very peculiar one. One spar only had been found, but the cliffs and glaciers did not form a beach on which such things could be looked for. Still, the presence of even one spar was an indication of the direction of the currents. All Arctic men were very much indebted to Mr. Leigh Smith and to other icemen like him, who spent their time to good purpose in such explorations.

Mr. ETHERIDGE, F.R.S. (President of the Geological Society) said that when Sir George Nares' expedition returned, the geological collections brought home were submitted to him (Mr. Etheridge), and he had the great privilege of naming the new species. Since then Captain Markham had placed in his hands for examination the collection he made in Novaya Zemlya, and Mr. Leigh Smith had done him the same favour. Amongst the few specimens which the latter gentleman had brought were two or three of what appeared to be distinctly coniferous wood. To settle the age of that wood was a very important question. Was it eocene, cretaceous, tertiary, or any other age? After very careful examination of the cone which had been brought home, Mr. Carruthers had no doubt whatever that it belonged to the true genus *Pinus*. There were but two pines now known in the Siberian area, the *Pinus cembra* and the *Pinus pallasiana*. No other fossil plant-remains had been brought from that region, but he had no doubt that it was upper cretaceous. That settled the question of the existence of cretaceous rocks and fossils there. Beneath the cretaceous zone there was undoubtedly Oxford clay, which was one of the most important formations in Great Britain and Russia. Beneath that again were older rocks still. A great deal had been done with regard to the groups of palæozoic rocks in the northern regions, especially through Sir George Nares and Captain Fielding, who secured a fine collection of fossil mollusca and corals. Captain Markham's investigation of Novaya Zemlya had proved the existence in that island of carboniferous rocks, agreeing closely with those of the Pennine chain. Probably from Petchora Land to Spitzbergen was once continuous land. Sir Roderick Murchison had proved the existence of carboniferous rocks in Petchora Land and the Ural chain, but until he himself examined the specimens from Novaya Zemlya they were not known to exist in that island. Since Sir George Nares returned, the complete flora of those parts had been described; but unfortunately nothing had been done on the northern coast of Greenland to the eastward, and an exploration of that district and of Franz-Josef Land would give clearer information as to the geological history of the Polar regions, which he felt certain were largely composed of carboniferous rocks. By placing the several acquisitions together, and comparing notes on the Ural chain, Petchora Land, Novaya Zemlya, Franz-Josef Land, and Spitzbergen, a complete history could be obtained of those rocks which stretched away to the north of Asia and America. A remarkable relation exists between North America, Greenland, Scotland, and Derbyshire. He had submitted the cone brought home by Mr. Leigh Smith to Mr. Carruthers, than whom there was no better authority on such matters. From the peculiar form of the cone, probably each scale contained two winged seeds, and it belonged to the genus *Pinus;* and considering the paucity of the fossil flora of that region where so few flowering plants occur and scarcely a shrub of any sort, it was very interesting to have such evidence brought home. The great bulk of the collection brought home by Sir George Nares was carboniferous, but the coal found was of miocene age and 30 feet thick. No one could doubt this if he knew the plants contained in the shales, &c. The other specimens on the table were also tropical, and in the whole region examined by Sir George Nares none of the carboniferous corals discovered could have lived in water less than 77°, 78°, or 80° of temperature, so that most of the rocks of which the Polar regions were composed must have been formed in tropical seas. It was well known that large Ennaliosaurian reptiles (Ichthyosauri) had been found in Spitzbergen. There were other things brought back by Mr. Leigh Smith which he (Mr. Etheridge) could not yet make out, but they appeared to him to be older still. With regard to the great lava-flows, there appeared to be nine in succession, most likely occurring about the same time as that of the Giant's Causeway in Ireland, in the miocene period, or about the same age as the thick bed of coal found in Smith Sound. These lava-flows are perfectly horizontal for many miles, showing that their condition now was just as formerly. Great care should be taken in labelling specimens collected and brought home, otherwise they possess no history; hence the necessity of having thoroughly competent men accompanying these expeditions, so that by this means clearer knowledge might be obtained of the Polar or other regions. If explorers would only bring back well collected specimens, those who took interest in such matters would spare no time in order to examine and name them.

Captain BEAUMONT was quite ready to admit that Franz-Josef Land seemed to be the most promising route for the present. He considered himself more as one of the workers who pulled the sledges and went on the long journeys, than one of those who planned expeditions or gave scientific reasons with regard to currents and open water, but he was fully impressed with the importance of Arctic discovery, and of course quite ready to agree to what others considered best. The great object was to advance as far north as possible in a ship, and from that point continue the exploration on land, and Franz-Josef Land appeared to offer the best facilities at present. From the point which Payer reached he saw very distant land, and Mr. Leigh Smith had now proved that Franz-Josef Land was attainable by a ship in ordinary years. Still, after all the explanations that had been given he failed to see that any possibility of sledging had been pointed out. If the coast was as perpendicular as it appeared to be from the sketches, and if there were no means of laying out depôts and advancing with sledges, it would be very disappointing. He noticed that the last speaker had said that one of the most important things to be done, scientifically speaking, was the exploration of North Greenland. He himself had the honour of being appointed by Sir George Nares to explore that very coast to the eastward of Discovery Harbour. He was not able to go as far as he could have wished, and the men who were with him, whom few people would suppose took any interest in scientific discovery, were just as much disappointed as he was. That was a very clear proof of the fascination of Arctic travel. However, from the point which he did reach, and from the very high altitude at which he surveyed the northern portion of the horizon, he was of opinion that he did not see the most northern land. The spot where the *Alert* wintered was the furthest that had yet been reached by any ship, and he believed that extended journeys along the north coast of Greenland would be productive of a very great deal of useful scientific knowledge. He was afraid that he was the only one present who held that opinion, but he held it because he had been to those parts. He believed that it was just possible that in another year a ship might be able to go still further up Smith Sound. Certainly the coast was not a very promising one, but there were places where a ship could winter, and now that such valuable knowledge had been gained as to the actual position of the land, it would be possible with well-disposed depôts to reach a very much higher limit than had ever before been attained. He himself was out sledging 132 days, and he thought it was not too much to expect that, allowing sixty days at six miles a day, it would be possible to go much further than he himself went. From the highest point of the hill on which he stood he saw land stretching away 50 or 60 miles and fading in the horizon, giving promise of extending very much further. It did not, however, run directly north; but even if it trended to the south beyond the most northerly point seen, it would be very interesting to know that Greenland was an island. The most distant point reached on the east coast of Greenland was Cape Bismarck. If a point could be reached from the west, where it was certain that no land extended to the north between that spot and Cape Bismarck, then it would be satisfactorily proved that Greenland was an island. However, he was afraid there was not much chance of an expedition being undertaken at present, because a ship could not be sent up Smith Sound without another to take care of it, and that would necessitate a very great outlay. In the direction of Franz-Josef Land, however, there was a prospect of prosecuting research by one ship.

Admiral Sir **Erasmus Ommanney** expressed his admiration of the services to geography rendered by Mr. Leigh Smith, especially for the great efficiency of his expedition and the consummate skill in conducting it. He had very much enlarged our knowledge of Franz-Josef Land, and had shown the way to reach it. The late expedition under Sir George Nares proved that the Pole was unapproachable by way of Smith Sound; as all other points afford no hopes of penetration to the north, we must now accept Franz-Josef Land as the base for future operations, and he was happy to know that Mr. Leigh Smith was going again to the Arctic Regions to follow up his researches. It had always been a mystery to him how the icebergs from Franz-Josef Land disappear. Enormous bergs like those which drift down the coast of Greenland as far as 42° N. lat., never drift near the coast of Lapland or Norway, and the North Cape lies in the high latitude of 70°. As icebergs were seldom seen north of Spitzbergen, it was formerly supposed that no larger mass of land would be found towards the Pole, therefore the bergs seen by Mr. Leigh Smith were an important discovery. He was sure that the name of Mr. Leigh Smith would be handed down to futurity as one of the great Polar explorers of the Victorian age.

The PRESIDENT, in concluding the discussion, said that those who were interested in Arctic discovery would, after that evening's discussion, be glad to see it prosecuted in two directions, one, that which was pointed out by Captain Beaumont, from Smith Sound along the north coast of Greenland; the other from the spot which Mr. Leigh Smith had reached in Franz-Josef Land. Without wintering in Franz-Josef Land, it would be impossible to determine whether that route could be followed or not. Strong reasons had been advanced in its favour by Sir George Nares, qualified, however, by prudent cautions. How far the open water was continued to the northward it was impossible to say, nor was it yet known whether the coast trended eastwards or directly northwards. If it went in the latter direction, and there were no great disadvantages from its contour, that would seem to be the route by which the greatest progress could be made towards approaching the Pole. It was an honourable ambition among Englishmen not to be outdone by the discoverers of any other country; and whilst the main object of the Society was geographical discovery, they could not be insensible to the honour to be attained by those who pushed exploration furthest in the polar regions. He for one would be very glad to find explorations carried on both along Franz-Josef Land and the north coast of Greenland. These, however, were matters which would very shortly be considered by minds far more fully informed on the subject, and far more competent to come to a decision than he was.

A Journey through Semirétchia to Kuldja in 1880.

By E. DELMAR MORGAN.

(Read at the Evening Meeting, January 31st, 1881.)

THE Russian military province of Turkistan extends from the Aral Sea on the west, nearly to the 85th meridian east of Greenwich on the east. Its greatest length along the 43rd parallel is about 1200 miles, its greatest breadth from north to south along the 73rd meridian is 400 miles. It comprises the governorships (oblasti) of Syr-daria, Semirétchia, and Ferganah, the temporary circuit (okrug) of Zerafshan, the Kuldja region conquered in 1871, and the department of Amu-daria acquired in 1873. It occupies an area of about 400,000 square miles, equal to one-twentieth part of the whole Russian empire, or nearly to Germany and Austro-Hungary taken together, not much less than France, Great Britain, and Italy combined, and thirty-six times larger than Belgium. But in population Turkistan is very deficient, numbering little over three millions, and the extent of land capable of cultivation is insignificant, not exceeding one-fiftieth of the whole superficies, or 5,400,000 acres; whilst the larger part is neither fit for agriculture nor pasturage.

The inhabitants of Turkistan belong to two great races, the Indo-Germanic and the Mongolian. These again may be divided and subdivided into an infinity of branches and tribes. Suffice it to say, however, that by far the largest number, about one-half, belong to the Altaic or Turko-Tatar branch of the Mongolian race. These are the people known as the Kirghiz or Kazaks, as they call themselves, who roam over the great plains and mountains on the north and east, leading a semi-nomad life; whilst the sedentary population, grouped in towns and villages on the south, are for the most part Aryans or Indo-Europeans. Through these two sections Russian colonisation is beginning to take effect,—here restraining within certain bounds migrations of pastoral tribes encroaching upon their land, and to some extent influencing their customs, there competing with the native industrial and commercial classes, opening up new channels of trade and material prosperity. Over all these is the Russian administration, making roads, establishing postal and telegraphic communications, building schools, bridges, and other public works.

It is perhaps unfortunate for progress in Turkistan that the government as at present constituted is essentially military. Every official, no matter what his functions, obeys the orders of a military governor-general. Every question concerning the development of the resources of the country has first to be considered from a military point of view; the civil or, as we should say, practical side being subordinate. Of course, as long as there was fighting to be done, opposition to overcome, and insurrections to subdue, a strong military rule was indispensable; but since 1876, when the revolt in Ferganah was effectually put down, the most refractory and warlike of the tribes have become submissive, and peace reigns throughout the length and breadth of Turkistan. General Kaufmann's remark was that unarmed any one might safely travel in any part of his province; adding that this was in singular contrast with the state of affairs in the Caucasus, where at least fifteen years after the subjugation of the mountain tribes, no Russian's life was safe unless he were armed to the teeth and provided with a strong escort. My own experience fully confirms this.

As an illustration of the safety of travel in these regions I will instance the case of a young lady whom I chanced to meet at Kuldja. She had travelled from her home in Wilna to Tashkend, a distance of about 3000 miles, entirely alone, to take a situation as teacher in the girls' school, trusting to the good faith of these semi-barbarians, and she never had to complain of a single act of rudeness or incivility. And I was told at Verny (Vernoe) that the higher officials, who wish their sons to receive all the advantages of the best education, are accustomed to send them quite alone to St. Petersburg and Moscow, and that they never fail to reach their destination safely.

There are two post-roads to Turkistan from European Russia. The more direct southern one starts from Orenburg, crosses the steppe to the lower Syr-daria, and proceeds up its right bank to Tashkend. The more northern and circuitous route leaves Ekaterinburg and passes through Western Siberia to Omsk, whence it takes a south-easterly direction along the right bank of the Irtish to Semipalatinsk; then turning almost due south, it enters the governorship of Semirétchia near Sergiopol. Of these two routes, which meet at Chimkend, 75 miles north of Tashkend, the first is the more difficult, owing to the wild, inhospitable, and uninhabited nature of the country through which it lies. It was, moreover, unavailable in 1880 by reason of the bankruptcy and death of the postal contractor, so that all mails and most travellers were obliged to follow the West Siberian route. This accordingly I also decided to take; but shortly before starting from St. Petersburg, General Kolpakofsky, Governor of Semirétchia, with whom I had the honour of an interview, recommended a third and better way, by which government couriers and officials performed the journey rapidly and well. This line of communication also starts from Orenburg, and leaving the first-mentioned road at Orsk, skirts the eastern slopes of the Ural range in a northerly direction, afterwards continuing almost due east to Omsk, where it meets the more northerly post-road. Besides these great highways into Turkistan, caravan routes traverse the steppe in all directions, and innumerable paths and tracks across plains and mountains known to the inhabitants intersect and prolong the main lines of communication.

One day at Orenburg, reached in about sixty hours by rail from Moscow, sufficed to complete my preparations, to buy a sledge, and hire a servant; and leaving behind its smoke-stained, half-ruined buildings, slowly rising from the ashes of the great fire in 1878, I started on the 28th February, 1880, for my long journey to the East.

Near Verkh-Ouralsk, a small fortress-town, the river system of European Russia ends and that of Siberia begins. From this point the route lies along the line of Cossack settlements and forts which formerly served as a frontier to protect Asiatic Russia from the inroads of hostile tribes who scoured the great plains on the south. Now all this is changed; the forts are dismantled, and their garrisons are employed in other ways.

Of the few travellers I met, none were journeying for pleasure; they were mostly officials on their way to appointments in Siberia or Turkistan, or homeward-bound on furlough. Of the towns passed on the road, Troitsk is the most important, and is a favourable type of a steppe town. Founded 120 years ago, it has risen to considerable importance, owing to its trade with the nomads, who make it their place of rendezvous with Tatar and Russian merchants. Here sheep and hides are bartered for the wares and manufactures of European Russia. Troitsk, too, is the military centre of the district of Turgai which marches with Turkistan on the south and with the district of Akmolinsk of Western Siberia on the east. From it a caravan route crosses the steppe, and it may probably become the starting-point of a Central Asian railway, General Kaufmann having declared himself in favour of this direction for the proposed line. Troitsk can boast solidly-built stone houses, a large bazaar, a gostinny door, a court of justice, a good gymnasium for boys, founded by the town, at which a good general education is given for the small sum of 12 roubles (1*l.* 6*s.*) per annum, mosques, and churches. Petropavlofsk is another steppe town, 330 miles beyond Troitsk, much frequented by nomads. Between this and Omsk the road passes through large forests, chiefly of pine and birch, while good-sized villages stand by the roadside. Their inhabitants, besides Cossacks, are emigrants from Voronej in Little Russia, and some are from the district (or oblast) of Tava in Western Siberia.

My first impressions of Turkistan, where I arrived the first week in April, were not very agreeable. Hastening southward in the hope of meeting spring and warm weather, which would allow me to explore the mountains and make collections, I found myself detained at Sergiopol by the impassable state of the roads. Though situated in 47° 56′ 29″ N. lat., i. e. nearly in the same parallel as Orleans, Sergiopol lies in a zone of cold winds, and for nearly three weeks I remained in this wretched little Cossack stanitsa, anxiously awaiting the disappearance of the snow and the breaking up of the rivers. An unusually late spring, however, had retarded everything; it was not till the 6th April that water-fowl began to arrive in the lagoons on the left bank of the Ayaguz, opposite Sergiopol, and the river itself did not move till the 14th. Five days later my things were all packed, horses were ordered, and I was on the point of starting for Bakhti, a Russian fort on the frontier south-east from Sergiopol, situated at the foot of the Tarbagatai range, when I received a telegram desiring me to proceed direct to Verny without any further explorations. This was as disagreeable as it was unforeseen, and I decided on appealing for permission to General Kaufmann himself, but the result was unsuccessful.

Sergiopol (formerly Ayaguz) received its present name from Sergius, a younger son of the Emperor; it is the capital of a large district, including the country southward as far as Lepsa and the foot of the Ala-tau range, but there is an idea of incorporating it before long for administrative purposes with the governorship of Semipalatinsk. A route passes through it to the Chinese frontier town of Chuguchak, distant only 192 miles, and by this a large trade was formerly carried on with China, before the overthrow of her power in these countries, a trade that may again revive.

To the traveller coming from the north, Sergiopol is the threshold of Turkistan. From this point, even though he be kept to beaten tracks, he will find a difference, and must be prepared to trust to his own resources rather than depend on the aid afforded by road passes and official introductions. Here he leaves behind him the rapid travelling and comfortable post-stations of Great Russia, and fairly enters a new and thoroughly Asiatic province. Physically, too, the country is distinct;

on the north-east rises the great treeless mountain chain of Tarbagatai, a branch of the Altai system, extending in an unbroken line for 400 miles from east to west, nowhere attaining the limit of perpetual snow, yet forming a distinct barrier between the Semipalatinsk governorship of Western Siberia on the one side, and Semirétchia or the Seven River district of Turkistan on the other. North of it the rivers flow towards Lake Zaisan and the basin of the Irtish, south of it to lakes Balkhash and Ala-kul. Westward this chain is continued far into the Kirghiz steppe, under the name of Jinghiz-tau—low, rocky ridges of hills abounding in copper and other minerals, and resorted to by Kirghiz at all seasons of the year, but especially in winter.

Having plenty of time at my disposal, I determined to explore the Jinghiz-tau and become acquainted with the habits and customs of the people. My companion was an ataman of Cossacks, who had received the four crosses of St. George (only given for bravery before the enemy) for his services under Skobelef during the campaign of 1876 in Ferganah. Two Cossacks and a Kirghiz djigit or guide, all mounted on Kirghiz horses, formed our escort, while a camel laden with spades and pickaxes followed with his driver to enable us to carry out any investigations, and particularly with the view of exploring a curious cave known in the country as "Jingerrh-tash," or sounding stone. For about three miles we followed the right bank of the Ayaguz, and then turned into the hills in a north-westerly direction. After riding about 10 miles, we stopped to drink tea at a Kirghiz yurta standing with several others on the bank of a small stream sheltered by a ridge of rocks. Its inhabitants earned a precarious livelihood by cutting the dried bushes of dwarf red willow for fuel and supplying it to the inhabitants of Sergiopol, the coal seams not being worked. After another ride of 10 miles, we had to pass the night at the hut of a Cossack shepherd.

In the morning we rode across the Ak-chau-li hills, 3000 feet above sea-level. To the south-west rose the solitary peak of Sandik-tash or "box hill," a notorious haunt of robbers. Snow lay in considerable depth in the hollows, and would have rendered riding difficult had it not been for a hard crust on the surface which supported man and beast. At about 10 o'clock in the morning we arrived at an encampment of Kirghiz. Here we alighted, and received a warm welcome from Timur-bai, uncle of our guide, a man of some weight and importance from the functions he exercised of *bi* or judge, as well as for his services to the Russian authorities.

Shortly after crossing the Ayaguz, the post-road leaves this river on the right, and skirts low detached spurs of the Jinghiz-tau range, barren conical hills, without a tree to relieve their ugliness. The spring vegetation had begun shooting up, and clothed the rolling plain with verdure, giving it an almost cultivated appearance. The loamy soil was half covered with herbaceous plants, resembling the familiar produce of vegetable gardens in Europe, and with the help of a little imagination one might almost have fancied oneself among fields of carrots, cabbages, and beetroot. No streams of water impart life to the scenery, no moisture sustains vegetation after it has once withered in the fierce heat of summer. In deeper hollows, where springs have forced their way to the surface, at distances of 20 miles apart, stand mud-built station-houses called "pickets" (doubtless from their having been Cossack outposts when the Russians first entered the country), pronounced "bikets" by the natives. These keep open the long lines of communication between centres of population, and serve as welcome resting-places for the tired traveller.

The winter had been so protracted, and the complete break down of direct communications between Tashkend and Orenburg had thrown so severe a strain on the only available post route to European Russia, that progress was almost impossible. The horses were so weak from starvation, that they could hardly get from one station to the other, even at foot's pace. More fortunate than some, I neither passed the night on the open plain, nor, still worse, was detained for days at one of the stations. Eight miles beyond the third picket of Kizil-ki or red hill, where the road again approaches the river Ayaguz, on its right bank well wooded with willow, stands a rude stone monument known as Kuzu-Kerpetch, the subject of a romantic tale of Kirghiz life about two centuries ago. Game of all kinds abounds here, and I saw hares, partridges, and black game; whilst on a willow-tree two berkoot eagles were keeping watch.

In another 20 miles there is a change in the uniformity of the landscape. The soil becomes sand or clay encrusted with salt; tough grass, heaths, and scrub wormwood impart a tinge of green to the surroundings, and vast sheets of water indicate that the lowest part of the country is reached, and that here must formerly have existed the connection between lakes Balkhash and Ala-kul, now enclosed in separate basins. From the Arganati hills above the station-house, the former of these lakes is visible only 20 miles to the west, receiving the waters of the Seven Rivers. Its shores, deserted in summer by all save the wild boar and the tiger, are in winter the favourite resort of nomads, who find shelter in the tall reeds from keen winds and storms, and food for their cattle in the scanty vegetation.

Much as I could have wished to have visited Balkhash—a paradise for sportsmen and zoologists—my steps led me in an opposite direction. Ala-kul, the mysterious lake with its island hill, conjectured by Humboldt to be the centre of the subterranean forces of the continent, had always excited my curiosity. To be so near and yet to leave unvisited scenes of such interest, would have been an omission. I decided therefore to disobey orders, and turned off the high road, taking once more an easterly course at the foot of the Ala-tau mountains.

The Dzungarian Ala-tau, the first step in the series of ascents to the highlands of Central Asia approached from the north, appears in the distance like a massive rampart with snowy parapet extending as far as eye can see towards the east, and bounding on the south the lake basins of Balkhash, Ala-kul and Sassik-kul. But on closer acquaintance it is found to consist of several nearly parallel chains, considerably lower than the main range, though adding much to its width. The outer hills, composed largely of Jurassic formations, are cut by the rivers Lepsa, Baskan, Sarkan and Ak-su, bursting through deep and almost impassable gorges into the plain below on their way to join Lake Balkhash. From the summit of the first ascent I distinctly heard the roar of cataracts in the higher ice-bound granite cliffs four or five miles off. Immediately before entering Sarkan, a large flourishing settlement of Mongol refugees and Russian peasants, situated at the foot of the hills, some huge boulders are seen to the left of the road. It is difficult to account for their presence otherwise than by referring them to an epoch when these plains were covered by a glacial ocean, and gigantic icebergs deposited their burden on the then submerged surface. Lepsa itself lies under the shadow of the principal range, in an amphitheatre of mountains bearing the local Kirghiz name of "Djeilau," or summer pasture grounds. Some years ago I heard Lepsa spoken of as the most picturesque spot in Turkistan. Then it must have been newly built, now its buildings have a dilapidated appearance quite out of keeping with the magnificent scenery. Although at an elevation of 3500 feet, its climate is temperate and healthy at all seasons of the year; rainfall supplies every need of the agriculturist, and even timber is not wanting in the higher mountains. Alpine scenery, lakes and waterfalls lend additional charms to its neighbourhood, and its rich and diversified flora, comprising Himalayan forms, make it a favourite resort of botanists. A little industry might make of it a terrestrial paradise. But Russian colonists in Semirétchia, Cossacks and emigrants from Little Russia, have yet to learn how to make use of the ample materials by which nature has surrounded them. Receiving free grants of land, with immunity from taxation and military service for fifteen years, the agricultural settlers, who mostly came from the government of Voronej, were at first satisfied. They felled timber heedlessly, and built themselves "mazankas" or homesteads, each with its cattle shed and wattle fence; they raised wheat and other kinds of corn; they kept bees and sold honey. Their only complaint was that a market could not always be found to dispose of the abundant produce of their land. Their condition altogether contrasted favourably with that of their Cossack neighbours, who were mostly of Siberian or Great Russian origin. But times are now less prosperous. Complaints are heard of bad harvests, owing to severer winters, doubtless in part attributable to the destruction of forests, of new regulations against felling timber, of the strictness with which these are enforced, of their constant disputes with Kirghiz about the land. Moreover, they are in ignorance as to their future position when immunity from public burdens ceases. They dread the remodelling of their land tenure, and being placed on the same footing as their neighbours the Cossacks. All this renders them discontented, and they talk of migrating. But to return to my visit to Lake Ala-kul.

I started from Lepsa on the 29th April with my Tatar servant and a Kipchak guide, furnished with a document in Russian and Turki from Colonel Lissofsky, district governor, desiring all local authorities to lend me every assistance in their power. Before we had gone 200 yards our axletree broke; so we unharnessed the horses and performed the rest of our journey on horseback. Riding over fine grassy downs in a northerly direction, we crossed the outer range called here Bas-rek, 4500 feet by my aneroid, and then gradually descended. About midday we came upon a number of Kirghiz seated in two large rings, men in one and women in the other, on the ground, celebrating, as I afterwards learned, funeral obsequies for their departed relatives. Our sudden appearance, and the guide's imprudent and unnecessary demand for horses, caused a rapid dispersion of this singular and to me novel assemblage. In a few minutes horses were caught, and there was a *sauve qui peut*, the younger women, who are always the best mounted, taking the lead and soon distancing pursuit. While this was going on, I rode forward to a knoll, where I became the centre of an excited crowd, all talking at once and evidently in bad humour at our unwelcome interruption and the proceedings of the guide Urassan-bai. Some elderly females approached close, raising their voices, and from the expression of their features I gathered that their remarks were the reverse of favourable. Finding, however, that they produced no effect, and that I was not aggressively disposed, they calmed down, and as I slipped a silver coin into her hand, a fair Amazon surrendered her steed to me with the best possible grace. Continuing our ride, we crossed the Chinjali at Kizil-djar, where it flows between red auriferous sandbanks. On our right was the grass-covered plain of Kizil-Ashi at the foot of Chibungtu, a high group of hills separating us from the Tentek. This river issues from the mountains by three sources, upon each of which stands a colony of Little Russians. We passed the night at the aoul of Malai bek Sultanof, a well-to-do Kirghiz sultan, and the following morning descended to the plain through which the Tentek hurries its impetuous course towards the lakes. This is a dangerous river to cross in flood time, and particularly after noon, when its torrent is swollen by melting snows in the higher mountains. Near the ford lies the Russian settlement of Utch Aral ("three islands"), where I saw peasants at work with yoked oxen. About 10 miles further the land was inundated, and deep watercourses, thickly fringed with tall reeds, had to be crossed. Here we halted for a time.

Towards evening we reached a large sheet of water, pronounced by the guide to be Ala-kul, and he pointed to a hill saying that it was Aral-tiube. This was inaccurate, for on returning to Lepsa and consulting the map it was evident that the particular lake I saw was not Ala-kul, but a more westerly sheet of water, either Uyalli-kul or Sassik-kul, forming a link in the lacustrine chain connecting Ala-kul with Balkhash. No doubts, however, crossed my mind at the time, or interfered with my enjoyment of the scene, as, selecting a spot free from reeds where the waves splashed a pebbly shore, I spread my rug and passed the night with sextant and artificial horizon. In the morning the broad belts of reeds margining the lake were literally alive with water-fowl, and daybreak was ushered in by a noisy chorus from swans, geese, cranes, and ducks of all kinds.

A phenomenon here worthy of notice is the frequent occurrence of thermal springs. I did not personally visit those east of Lake Ala-kul, but at Arassansky post-station in the plain at the foot of Hasford Pass, 20 miles before reaching Kopal, sulphur springs are formed into baths highly esteemed in cases of rheumatism and other ailments. Again in the Borokhoro range, in a beautiful wooded defile of the Upper Kash, hot sulphur baths with a temperature of 122° Fahr., as measured by myself, are formed out of natural solid rock. And it is remarkable that in both these localities cold springs occur side by side with hot. This juxtaposition has at Arassan led to the accident of mixing the two, thereby diminishing the temperature and, it is said, impairing the efficacy of the cure. In the Borokhoro natural baths resorted to by natives, a thin cold stream issues from the rocks, and has been adjusted by a simple contrivance in such a way that a bather may have a jet of cold water trickling on his eye. This has been devised as a cure for ophthalmia, a prevalent complaint in this region. At the coal mines north-west of Kuldja, a jet of hot steam escapes from the ground, and has also been used for curative purposes by means of a chamber hollowed out of the hillside. These and naphtha springs, solidifying into beds of asphalte, as I understand they do on the shore of Lake Balkhash, are indications of latent subterranean forces at work in Turkistan. Earthquakes occur more or less frequently near Tashkend, but active volcanic eruptions are nowhere seen. Yet one more feature remains to be noticed. Scattered over the whole country between Sergiopol and Kopal, anciently forming the kingdom of Dzungaria, are tumuli or circular mounds varying from 10 to 100 feet in diameter. Rows of stones are placed round them, and in some cases rudely carved figures of warriors are found in a recumbent position upon them. These stone figures represent men with thick moustachios, but without beards, holding in their right hand a cup, and grasping with their left a double-handled sword stuck into the belt. At the back of the head are a number of small plaits of hair, quite unlike the long tress worn by

Mongols of the present day. These monoliths are about seven feet long, and those I saw had been either sawn in half or otherwise defaced, and used as gate-posts and benches by the inhabitants of Sergiopol. I excavated four of these tumuli to a depth of 20 feet, but without discovering anything of interest, except a copper coin with the tamgha or seal of Tamerlane.

From Lepsa there is a direct route to Kuldja across the mountains, and I had hoped to have availed myself of it in order to see this town before proceeding to Verny; but learning that the passes were blocked with snow at this early season, and that there would be some difficulty in obtaining permission, I decided to follow the post-road which crosses the mountains much further to the west by a pass 3350 feet high, made by a former governor-general of Western Siberia, Hasford, whose name it bears. From its summit a fine view is obtained, looking north over the plain, through which the rivers Ak-su and Bien wind like ribands. On the south-east lofty mountains rise above the snow-line, where the upper tributaries of the Karatal take their rise, flowing westward to join Lake Balkhash, whilst down their southern slopes the Borohudsir, Ussèk, and Horgos pour their waters towards the Ili. With this region I became better acquainted on my way back, when I followed the Borohudsir to its sources in the lofty valley of Yugen-tass. At Kopal, situated at the foot of a range of mountains, telegrams were waiting directing that I should proceed at once to Verny, whither I journeyed without loss of time, crossing the Kok-su by a bridge at Tsaritsin and the Ili by ferry at Fort Ilüsky. The great range with snowy peaks at the foot of which lies Verny is called by the Russians Trans-Ili Ala-tau, and forms the southern boundary of the Ili valley and of the so-called *steppe* country. Beyond it rise range after range of lofty mountains enclosing Alpine lakes and valleys, nowhere descending below 5000 feet of absolute height, and giving birth to the great rivers of Asia. Verny, originally a Cossack stanitsa and afterwards a fortress, has developed into an important city. As the centre of the Seven River governorship, it is the place of residence of General Kolpakofsky, and the principal military and civil officers. Under the auspices of M. Gourdet, a French architect in the Russian service, I was introduced to the lions, including the new palace of the governor, designed by him, the gymnasium beside it, botanical garden, &c., &c. But the most interesting sight was the Almatinka valley (the Kirghiz name of Verny is Almati, from Alma, an apple), when its apple-trees were white with blossom, mingling with the delicate pink of the apricot bloom, and reaching as far as the governor's summer residence, 2000 feet above the town. On either side the steep declivities, clothed with luxuriant grass, were stained with dark red beds of peonies, and at our feet purple and lilac irises coloured the ground, from which shot up tall flower-stalks of lilies and hollyhocks, with buds ready to open in a few weeks' time.

From Verny I made an expedition to Lake Issyk-kul with a young engineer officer. Leaving the Kastek Pass on our left, we followed the post-road to Pishpek, crossing the mountains by the Kurdai Pass, and descending into the Chu valley at Constantinofka, where this river is spanned by a wooden bridge.

At Pishpek I met General Kaufmann, and witnessed the interesting ceremony of presenting rewards and decorations to native chiefs and others. A numerous assemblage awaited the arrival of the *Yarim Padishah*, as he is called, ranged in a wide circle in front of the house where he was expected to alight. Among those present were Shabdan and Manapai, sons of Djantai, late manap of the Sari-bogish tribe; Baitik, chief of the Sultús, conspicuous for his height and handsome velvet robe, with gilt epaulettes denoting his rank in the Russian army. He it was who invited the rebel Sarts to a feast, and after entertaining them with pilau and other dainties, had their heads taken off.

On either side of the doorway were ranged tables with bread and salt offerings from various classes of inhabitants,—Dungans, with their leader in green silk halat and white turban, before whose fanaticism the Chinese melted like snow; Tatars, Sarts, and grimy Russian colonists led by their priest, a tall, handsome man, who drank vodka like water, and as General Kaufmann drove up, slipped on a gorgeous vestment, and advanced, crucifix in hand, to pronounce benediction. The investiture of the following morning might have had some resemblance to a durbar, except that it lacked the glitter and splendour of the Indian ceremony. Here all were equal before the representative of the White Tsar, and sat patiently on the ground for hours waiting his arrival. The General, in white undress uniform, with black and yellow ribbon and white enamel cross of St. George—a recent mark of distinction conferred upon him by his sovereign—walked round, stopping to exchange a few words through his interpreter with each recipient, who, besides the medal or halat as the case might be, received a document in which were recited the services for which it was bestowed.

A botanising excursion into the mountains with M. Fétissof's native collectors helped to pass time at Pishpek, and as soon as the governor and his suite had passed we started for Lake Issyk-kul. We stayed for an hour at Tokmak, less than twenty years ago a Kokandian fortress, afterwards a Russian district town, and now chiefly remarkable for its bazaar, one of the best in the country. The land in the Chu valley is well cultivated by Dungans, of whom a large colony is settled near Tokmak. They are refugees from Kashgaria, whence they fled for their lives on the return of the Chinese, suffering terribly in crossing the high passes of the Alai in winter. Their condition on arriving at Fort Naryn was described as deplorable.

We came in sight of the west end of Lake Issyk-kul at Kutemaldi. Here I left the road, and walked about a mile and a half to the rivulet of this name, believed by some to be an artificial dyke constructed by Kirghiz. I found it, however, to be a natural watercourse, and its feeble current trickled towards the lake, which has at present no visible outlet.

A rapid drive of 140 miles along the Kungé, or northern shore of Issyk-kul, brought me to the Russian settlement and fortress of Kara-kol at its eastern extremity, 600 feet above the lake, and 6000 feet above sea-level. Why it should have been placed 10 miles from the shore instead of on it, is a question I never heard satisfactorily answered. My stay at Kara-kol was unfortunately limited to a few hours, but in this short time I managed to call on M. Kolpakofsky, brother of the General and district judge, and M. Kurtkofsky, chief of district, residing at his pretty villa on Djirgalan Bay.

Returning by the route I had come as far as Djil-Aryk post-station at the foot of the Bome Pass, I crossed to the right bank of the Chu by the Semeonofsky bridge, and entered the valley of the Lesser Kébin, where I found encampments of the Sari-bogish tribe, whose chief Shabdan had undertaken, by General Kaufmann's desire, to find me guides. He received me with hospitality, placed a felt tent at my disposal, and conversed through an interpreter. He said that he and his sons and young men were preparing to march to the Naryn, to assist in the anticipated operations against China, a power they all detested, and he thought it would be a good thing if England and Russia were to combine their forces against the common enemy. He showed me his herd of Tibetan yaks, and on wishing me good-bye before retiring to the seclusion of his kurghan or walled garden, expressed a hope that we should meet on the Naryn.

Early the following morning I set off with a Kirghiz guide, and one led pack-horse for my baggage, to cross the mountains by a pass 8600 feet high, descending on the opposite side by the bed of a torrent obstructed with boulders, the small Kirghiz horses scrambling down with cat-like activity.

I returned to Verny on the 4th of June. My business here was to obtain permission from the Governor-General to proceed to Kuldja, which was finally granted after much delay and difficulty by his Excellency.

So many accounts of the Mahommedan insurrection of Western China have appeared in books and newspapers, that it is unnecessary that I should give an historical sketch of it here. Suffice it to say, therefore, that on the repudiation by China of the treaty negotiated at St. Petersburg in 1879 with her envoy Chung-how, orders were despatched to the Governor-General of Turkistan to prepare for war, and, as I approached Kuldja towards the end of last June, troops were concentrating upon it, and there seemed every probability of a grand expedition, crowned perhaps by a triumphant march to Peking.

From the summit of the pass at Altyn Immel, an easy descent leads to an arid stony plain, having the appearance of a desiccated sea-bed with ridges of rocky hills rising from it, and snowy mountains bounding the distant view towards the north. The road is everywhere good, and our progress would have been tolerably rapid had not orders been received at the post-stations to keep horses in readiness for General Kolpakofsky, whose arrival was hourly expected. At each station Kirghiz elders were waiting to welcome him; felt tents had been pitched for his accommodation, and djigits were ready to gallop off at the top of their speed, and carry forward the news of his approach. One of these, mistaking us for the chief, and without stopping to inquire, set off as hard as he could.

The first cultivated land is seen at Borohudsir, a Russian settlement of about fifty houses, built of the usual material of the country—unbaked bricks, whitewashed and looking neat and clean, with rows of willows and poplars planted by the sides of dykes fed from the Borohudsir river. A well-kept government garden of fruit and other trees, with shady walks, gives the place a civilised look. A battalion of Turkistan riflemen had arrived the day before from Tashkend, and were parading in front of the barracks, marching as briskly as if they had only just started, and were ready to carry Russian civilisation on the points of their bayonets across the Gobi steppe and Great Wall of China. Borohudsir is now connected by telegraph with Europe, and on passing through it on my way home I sent a message to St. Petersburg. Between it and Kuldja are ruins of the Chinese towns and fortresses of Djar-Kent, Ak-Kent, Korgos, Chimpanzi, Alimptu, Chin-cha-ho-dzi, and Suidun. The remains of New or Manchu Kuldja are seen on the right of Suidun, and those of Baiandai on the left, 10 miles from Old or Taranchi Kuldja. Parks of kara-gatch or black elms and irrigating works mark the sites of once flourishing and populous colonies now falling into decay. The only remains of Chinese industry are bricks of a dark colour and remarkable durable quality used to pave some of the station-houses, and a few pieces of furniture carved in elm, screens and ceilings. Suidun is chiefly inhabited by Dungans, distinguished by their bold, independent bearing and superior energy among all inhabitants of these countries. They are in fact the avowed champions of Islam against Chinese Buddhism, differing from their co-religionists in the West in this important particular, that they have fought *with* and never hitherto *against* Christians, and of course affording a marked contrast in their activity and resistless energy to the passive, dormant, and degraded fanaticism of Persia and Turkey. Little is known of their past history, except that Mahommedans appeared in China as early as the eighth century, probably on the invitation of an emperor of China who asked for their assistance in subduing an insurrection of his own subjects, and then allowed them to remain and settle in China.

Whether this western section, the Dungans of the Ili valley, are related to the Mahommedans of Yunnan, of whom recent travellers have spoken, is uncertain. In language, dress, and manners, they are Chinese, but hold opium smoking in contempt, and, like other Mahommedans, shave the head and wear skull caps. As to their future, it is difficult to form an opinion. China advancing from the east has already taken from them Manas and Ouroumtchi with terrible retributive vengeance; whilst Russia, having already more Mahommedan subjects than she knows what to do with, is indisposed to offer them protection in her territory. In this way, placed between two hostile camps, they may disappear for a time, only to burst forth anew probably elsewhere, with that extraordinary vitality characteristic of Islam in the extreme East. Some hundreds of them are said to be leading a predatory existence in the mountains on the frontier.

Kuldja, to which a diligence or covered Chinese cart with two horses driven tandem runs daily from Suidun, is the only large town that has outlived the events of 1863–66 in the Ili valley; the ascendency of its Mahommedan population having enabled it in the early days of the insurrection to throw off the Chinese yoke. Always the resort of a mixture of races, Kuldja has become, since its occupation by Russia, more than ever a half-way house between East and West. In its crooked lanes and streets flanked by mud walls, with here and there a handsome gateway of Chinese moulded bricks, are to be met many nationalities,—Taranchis with dark, sunburnt faces, and downcast treacherous look, half ashamed of their bloody deeds, when they turned scythe and sickle into sword and spear, and administered the *coup de grâce* to many an unfortunate Manchu; handsome but effeminate Sarts trading in the stuffs and wares of Bokhara and Kokand, Solones and Sibos from the Trans-Ili colonies, pigtailed Kalmuks with flat face and high cheek-bones, and wild Kirghiz, white-shirted Cossacks, and smart Russian officers, booted and spurred, make up its busy life.

Approaching the town from the west, its general appearance loses much by the withered tops of tall poplars, touched by severe frost two or three winters ago; for, like most eastern towns, Kuldja is surrounded by gardens. Passing the Russian suburb, laid down on a scale of magnificent distances, we enter the citadel, within massive mud walls 30 feet high and wide in proportion, with four entrances, one on each side, defended by outworks of equal proportions with the walls. Two thousand Kalmuks were, it is said, driven by Taranchi taskmasters to build these mural defences, and one-half are said to have perished during the work. Inside the citadel is a handsome mosque, built in Chinese style, with decorated gateway, spacious courtyard, schools, and offices. Seen from a height, the rest of the enclosed space appears to be full of flat-roofed, mud-built houses, opening on courtyards, with occasionally a more substantial building. Passing through the citadel and out by its eastern gate, we find ourselves in an open space, divided by an avenue of trees, in which are some good brick houses and shops occupied by Russian and Tatar merchants, who are doing a good trade in tea, manufactured goods, silver, tobacco, &c., &c. Near these are the Sart shops and open booths, in which all kinds of trash are exposed for sale; a street with open watercourse and trees on either side, leads to the Chinese bazaar, and beyond it on the extreme east of Kuldja the Chinese quarter. This is the most interesting part of the town; it is in fact a glimpse of China. All the shops have counters, and are served by men and women, the men emaciated and prematurely old from opium smoking, some mere living spectres; the women with elaborate chignons and small cramped feet, walking as if they were on stilts. Here may be purchased all kinds of curious things from the middle kingdom; red and yellow bannerets are displayed outside these shops, with inscriptions in Chinese characters denoting the owner's name and business. Here, too, apothecaries dispense their drugs and make up recipes, some of their medicines being considered generally good specifics against headaches and all the ills to which flesh is heir.

Of course I was curious to see the Chinese Roman Catholic chapel. Vespers were going on when we looked in, and found the congregation, numbering about twenty, mostly women and girls, on their knees, devoutly joining in the responses, whilst a layman officiating said the prayers in Latin, but with a pronunciation wholly unintelligible to a European ear. Waiting till service was over, we spoke through an interpreter with the officiating acolyte. He showed us a Latin bible and book of prayers, from which he read a few lines. This had belonged to Padre Italiano, the missionary, who disappeared one day during the insurrection and was never heard of again.

A visit to a paper manufactory and a Dungan restaurant in the most crowded part of the bazaar concluded our tour of the town. On its outskirts are some private gardens or parks well laid out. The best of these is Airam-bagh, or deers' park, occupied by General Kaufmann during his visit last summer; near it is another, formerly General Wartmann's residence, and now the property of Consul Shishmaroff, late of Urga, who probably knows more about Mongols than any European living. In a third was encamped the headquarters of the army. About a mile to the south of Kuldja flows the river Ili, crossed here by a large ferry boat towed by swimming horses. The environs of the town are well cultivated with all kinds of corn, wheat and barley in particular, lucerne, and poppy. Large plantations of this are seen in all parts of the Ili valley from Suidun to the confluence of the Kash and above. Their brilliant coloured flowers light up the grey tints of the mud walls.

At Kuldja I remained nearly three weeks, and at last, having purchased horses and obtained guides, set off for the river Kash, one of the three principal feeders of the Ili. In a charming spot (Chijan-togai), beautifully wooded with elms, in park-like scenery on the right bank of the Kash, a deep and boisterous river, I found encamped the cavalry division of the expedition under the command of Colonel Matvéief, a military geographer of high standing. With him I passed a couple of days. The valleys of the Upper Kash and its tributaries are inhabited by Kalmuks, with whose mode of life I was glad of the opportunity of acquainting myself. Returning to Kuldja, I made an excursion to Sairam-nor, the "lake of wide tranquillity" of the Chinese, about 7500 feet above sea-level, going by the Talki defile and returning by Kizim-chik and across the mountains, following the Pelliuchi stream to the infantry camp at Mazar. Here Colonel Kuropatkine received me very kindly, and offered to find me a companion to the Musart Pass, which I had arranged to visit. Finding, however, that this would detain me too long in Central Asia, I decided, not without regret, to return to England, and accordingly set out on my homeward journey on the 1st of August.

The President, in introducing Mr. Delmar Morgan, said he need hardly remind the Meeting of the great interest at this moment attached to Kuldja, as being the border country between those two giant empires of the Eastern Continent, Russia and China, and indeed as being the apple of discord which had very nearly led to war between those countries. Kuldja was a portion of the Chinese empire until about fourteen or fifteen years ago, when the Dungans or Chinese Mahommedans, afterwards joined by the Taranchis, broke out in revolt, massacred the Chinese, and effectually established their independence. They celebrated their independence, however, by making themselves very disagreeable to the Russians, who in consequence went to war with them, and after some years subdued them. About that time Kashgar was also in a state of revolt, and China, having organised an expedition against that country, received assistance from Russia, the result being the overthrow and reconquest of the country by the Chinese, who thereupon called upon the Russians to restore them Kuldja. The Chinese ambassador proceeded to St. Petersburg to negotiate the points in dispute. The terms he agreed to were these. The Russians offered to restore Kuldja on condition that the Chinese defrayed the cost of the war in which they had assisted them, and gave them certain commercial privileges. But when the ambassador returned to Peking he was thrown into prison, and ran considerable danger of losing his head for having made concessions which were considered derogatory to the dignity of China. War was on the point of being declared; considerable forces were massed at the time Mr. Morgan was there; but happily war had been averted, Kuldja at present remaining in the hands of the Russians.

After the reading of the paper,

The President said, with one solitary exception, he believed Mr. Delmar Morgan was the only Englishman whom what Lord Erskine called "the restless foot of British enterprise" had taken to Kuldja. The exception was Mr. Ashton Dilke, who some years ago read a paper before the Society on the Valley of the Ili.* Mr. Dilke would now favour them with a few observations.

Mr. Ashton W. Dilke, M.P., said it had been a very great pleasure to him to listen to Mr. Morgan's paper. He himself was in Kuldja in 1873, and since his return had not seen any one from those parts. As travellers there were exceedingly few, and books about the country, even in Russian, still fewer, he was very curious to hear how far the natives had changed. He did not think they had changed very much. He could bear witness to the wonderful accuracy of Mr. Morgan's information.

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* 'Proceedings' (Old Series), vol. xviii. p. 246.

He himself travelled over the country with considerable care, taking notes of what he saw and heard, and he recognised almost every one of the exceedingly difficult and crabbed Tatar names of villages and streams which Mr. Morgan mentioned. When he heard that that gentleman had been forced to remain three weeks in Sergiopol, he pitied him from the bottom of his heart, though he himself spent only a few hours there. The news of the bankruptcy and death of the contractor who held the post-road between Orenburg and Tashkend was of peculiar interest to him (Mr. Dilke), for he once crossed that road. He did not wish to rejoice in the death or even in the bankruptcy of any fellow man, but he received that information with an inward smile of content, when he thought of how many days of misery that man had caused him to pass. In 1873 he had considerable difficulty in getting on with the Russian authorities. Personally they were everything that was civil, but the route was very closely guarded against Englishmen on account of the expedition to Khiva, which occurred that year. He travelled on the Chinese frontier of Siberia, and therefore took the same route to Turkistan as Mr. Morgan, but he was sent back from Semipalatinsk. No Englishman would at that time have had any possible chance of penetrating viâ Orenburg. After that he got down to Vernoe and went to Kuldja, chiefly relying not on any permission which he had obtained, but on the fact that General Kaufmann and Kolpakofsky were away at the time, and that the Russians had sent a large number of Polish officers to serve there, who were not sorry, if they could do so without prejudicing their duty, to give a foreigner, who was supposed not to be on particularly good terms with the Russian heads of the district, a lift now and then, or rather to allow him to give himself a lift, by winking at his irregular proceedings. In that manner he managed to penetrate to Kuldja, and cross the frontier to the north of Kuldja. He went down to Lake Ebi-nor which lay in the plain below. Then he came back to Kuldja and followed the valley of the Ili upwards, seeing the great mountain of Khan Tengri, 24,000 feet high, close to which he crossed the plain of Musart. Thence he went to the Issyk-kul, after which his route was the ordinary post-road. Perhaps Mr. Morgan exaggerated the badness of the Cossacks. Along the bottom of the mountains 20 or 30 miles eastward of Vernoe there were villages of Russian settlers, chiefly Cossacks, and those villages struck him as having reached a very high degree of prosperity, showing a considerable knowledge of agriculture. They had no market for their corn, it all being bought up by the post-road contractor, who made an exceedingly good profit of it. Mr. Morgan had stated that the Kirghiz had begun tilling during the last few years. It had only just begun when he (Mr. Dilke) was there, and some Russian officers prophesied a considerable future for it. He did not then think that the progress would have been so rapid. There was no doubt that the change of this nomad and pastoral to an agricultural and settled race would be one of the most curious things that the present generation had witnessed. There was a distinction between the different races of Cossacks as to their fighting qualities. The Caucasian and the Siberian Cossacks were good fighters, but the Don Cossacks were looked down upon by the remainder of the Russian troops. The statues which Mr. Morgan saw and the barrows on the plains were exceedingly curious. He had almost given it up as a hopeless task to account for them. The only explanation he could offer with regard to the statues was that various races at different times had taken the habit of making them from the races which preceded them. He could not in any other way account for the curious variations of feature in the statues, which were found from a little to the east of Kuldja right away to the south of Russia and Roumania and Bessarabia. Mr. Morgan had described a statue holding a cup in one hand and a sword in the other. Most of those which he (Mr. Dilke) saw had a hand over an object which was sometimes a cup and sometimes something else which he did not recognise. The river Kutemaldi was like the shield which had a golden and a silver side, about which the knights quarrelled. He himself once quarrelled with a gentleman in that very room, who asserted that the river Chu ran into Lake Issyk-kul, while he (Mr. Dilke) said it ran out. The real fact was that when the lake was full it ran into the river; at other times the river ran into the lake through the Kutemaldi. He understood Mr. Morgan to say that though the Dungans were Mahommedans, they had never fought against a Christian race; but surely they did fight against the Russians when the Russians took Kuldja, though at the same time there was going on a sort of internal fight between the Dungans and the Taranchis, which ceased on the appearance of the Russian invader in their midst. He thought Mr. Morgan had perhaps underrated the Catholic colony, or they might have degenerated. When he (Mr. Dilke) was there, one man not only read Latin perfectly intelligibly, but translated the Lord's Prayer into Tatar. He said that there were one or two besides himself who also understood Latin. The name of the priest whom Mr. Morgan had referred to as Padre Italiano was then Padre Toma. Kuldja was a very interesting country, being the meeting-place between two or three races. The mountain districts on the north and the valley to the south were inhabited by Kirghiz, but there were also the settled Taranchis, who were Tatars; the Dungans, who spoke a Chinese language; and the Kalmuks, these latter being descendants of the Kalmuks who used to live close to Astrakhan. During the last century they emigrated towards China, and were given land to settle on in the district of Kuldja. They had some very curious prophecies, one, undoubtedly ancient, that as they had left Russia, so some day the Russians would follow them; and another that whenever the winters became cold the Russians would come. It was an undoubted fact that the river Ili, which was very rapid, did freeze several winters in succession just about the time of the Russian occupation of Kuldja. The same proverb about the cold coming in with the Russians existed in several places in Russia. Kuldja belonged to Turkistan entirely and completely, and to him it was incomprehensible, not so much that the Russians should ever have given it up, as that the Chinese should ever be able to take it and hold it. The population was very fierce and not likely to allow itself to be handed over without a struggle. Kuldja was not like Kashgar which lay open to the east. The passes, he believed, were only three. That of Musart was said to be practically impassable, the glacier being so bad that camels had to be let down by ropes. In the first reports about the cession of Kuldja it was said that the Russians were going to retain the valley of the Tekes. Then there was a pass through the valley of the Yulduz, through which Colonel Prejevalsky once went, but which seemed to be long and difficult. There was also the main pass of the great road to Sairam-nor. The bridges on this were in bad repair. After the Chinese abandoned them they were blown up, or swept away by torrents. The road was not passable for artillery. In former years Kuldja was a Chinese penal settlement, guarded by an enormous force of soldiers; it was said that 70,000 of them were killed, for hardly one escaped the great slaughter by the Dungans in 1868. Kuldja was open and accessible on the western side to any force from Russia. He should like to ask Mr. Morgan if he had heard what territory the Russians proposed to reserve for the benefit of the natives who did not wish to live under Chinese control. The upper valley of the rivers down to Kuldja itself and even to Suidun was exceedingly fertile, but the country which might naturally be expected to be reserved was below Suidun to the old frontier. The change between those two parts was very marvellous, the upper being a flourishing, smiling valley, closely cultivated on the Chinese system, while the lower was for the greater part a barren steppe, inhabited by serpents and tarantulas.

Sir Douglas Forsyth said that the death of the Ameer, Yakoob Khan, had preceded the overthrow of his rule. He had a very strong conviction that if Yakoob Khan had lived the Chinese Government would never have got into Kashgar. He (Sir D. Forsyth) congratulated Mr. Morgan and also Mr. Dilke on their having been in Kuldja, which was to himself for a very long time a sort of promised land. He had looked in that direction with longing eyes when he crossed the Himalayas on his expedition to Kashgar, and his friend Major Trotter had formed most ambitious schemes for proceeding there and taking valuable observations. But unfortunately circumstances prevented their getting so far, but they heard of the presence of an Englishman there, and read some interesting letters from him which appeared in the newspapers. He could quite coincide with Mr. Dilke's description of the country from his experience of the country upon the other side of the mountains. It appeared that General Kaufmann took credit for the wonderful safety with which people could travel in his dominions. He (Sir D. Forsyth) had always had great admiration for General Kaufmann's administrative ability, but Major Trotter would support him when he said that the same degree of safety prevailed on the south side of the mountains. In the territory under Yakoob Khan, anybody who travelled properly accredited, and, indeed, any ordinary traveller, might go anywhere. He had seen bales of goods lying on the roadside untouched, and the people never went about armed. Mr. Morgan had referred to the *diligence* going backwards and forwards between Kuldja and the neighbouring towns, but there was a daily *diligence* from Yarkand to Kashgar and other towns in that part of the country. He suspected that it was rather a sign of Chinese civilisation, that these large two-wheeled carriages, capable of holding about a dozen people, and with four or five horses, did the journeys daily. The Musart Pass was simply impassable. The top for about 60 feet was a glacier, and it was almost impossible to take laden camels over, but history related how just to the north of that part the hordes of the Juths, Goths, and Huns passed from Mongolia. The son of Genghiz Khan removed the seat of his government from Karakorum to a place called Almalik near Suidun. Both Genghiz Khan and Jagatai, when they sent forth their armies to conquer and plunder the provinces to the west, sent them in three directions: one was down by Issyk-kul in the direction of Tashkend; another was by Kashgar through Kokand; and the third was over the Pamir to the river Oxus. Then they came back through the Yulduz valley, which was described as one of the most fertile valleys in the world. A native of Yarkand once said to him, "You consider Kashmir to be the paradise of the world; we consider Yulduz to be a paradise compared with Kashmir." The armies used to return there and hold a sort of open-air parliament, at which they divided the spoil, elected chiefs, and formed their plans for other campaigns. Until Mr. Dilke spoke, he had been under the impression that the easiest route towards China was through the Yulduz valley, but he now fancied there must be an easier pass a little higher up above Kuldja, leading direct to Manas. The Russians were most anxious to get the best trade route to China, the Siberian route being very long and inhospitable, and he had no doubt that in the future the great route to China would pass through Kuldja. The whole of that country abounded in coal, and he believed coal was to be found almost the whole of the way to China. Baron Richthofen, in his report, particularly mentioned this, and if there was any idea of making a railway, that would probably be the line it would follow.

The President, in conclusion, said that after hearing Mr. Morgan's description of the scenery at Vernoe, Mr. Dilke's account of the valleys that surrounded Kuldja, and Sir Douglas Forsyth's account of the beauties of Yulduz, he should expect to see streams of English tourists and travellers making their way there, as soon as the country was more freely open to Englishmen. These descriptions of the natural beauties of the country brought to his mind a story told him by Mr. Grant Duff. That gentleman was standing upon a terrace looking over the Bay of Naples on a most beautiful evening, when all exclaimed, "How lovely the scene is!" and expressed an opinion that probably there was nothing in the world so beautiful. A Russian lady, the daughter of a governor of a province of Siberia, who happened to be present, said, yes, it was very beautiful, "but oh, if you could only see Siberia!" He did hope that the time might come when Russian jealousy might be appeased, and when other enterprising English travellers would be able to add to the store of knowledge collected by Mr. Morgan and Mr. Dilke.

Journeys in the Interior of South Central Africa.

By F. C. Selous.

Map, p. 192.

Mr. F. C. Selous, a gentleman well known in South Africa as an enterprising traveller and a hunter of great determination and experience, communicated to Sir Bartle Frere, in the course of last year, brief accounts of two of his principal explorations; one across the Zambesi in the direction of Lake Bangweolo, and the other in the neighbourhood of the river Chobe. Although unprovided with instruments and, as he himself states in his letters to Sir Bartle, unacquainted with their use, he made sketch maps of his routes, and they form a distinct addition to our geographical knowledge of the interior. His communications are addressed from Klerksdorp in the Transvaal, the first bearing date February 4th, and the second March 20th, 1880.

1. Journey North of the Zambesi, through the Manica Country.

In the latter part of 1877 I crossed the Zambesi about 80 miles to the east of Victoria Falls, and followed its course along the northern bank to the mouth of the river Kafũkwe (the Kafue of Dr. Livingstone). Our party left Panda ma Tenka (the trading station south of the Victoria Falls) on the 22nd of October, crossed the Zambesi on the 30th, and reached the kraal of Mwemba, a chief of the Batonga tribe, on the 3rd of November. On the 13th of November we arrived at the Tchaisa, a small tributary of the Zambesi, on the left bank, and obtained from Senhor Lorenço Monteiro, a half-caste Portuguese trader established on an island in the vicinity, guides for our further progress and also much information about the road. The country of the Batongas had been recently laid waste by parties of Shakundas, who are freed or runaway slaves from the settlements near the mouth of the Zambesi, armed by the Portuguese. On our march between the Tchaisa and the Kafũkwe we passed through many villages which had been burnt and wrecked during the raid, and saw dead bodies of the Batongas lying in the footpaths. On the 24th we arrived opposite the mouth of the Sanyati, a river entering the Zambesi on the opposite side, from the south; its bed is one mass of huge boulders and about 150 yards broad. It being now the end of an unusually dry season there was but a mere driblet of water running down it into the Zambesi; but I can easily understand that after heavy rains it may be transformed into a roaring torrent. A few miles further down, the Zambesi flows through the gorge of Kariba, and its bed in many places cannot be more than 60 yards in width, narrower than any other part of the river I have seen; I threw stones across it easily. We made a slight detour here inland to avoid the hills of Kariba, and on the 28th of November crossed the Losito tributary, and reached Nhancoé, a Portuguese trading settlement, flourishing until two years ago, when it was surprised by a party of Batongas, who attacked it in retaliation during the recent raids against the tribe on the part of the Shakundas, and all the traders escaped across the river. We crossed from Nhancoé to an island called Cassoko, where a Portuguese trader, Senhor Joaquim de Mendonça, has established himself, and we remained here till the 13th of December.

On the date just mentioned we started for our inland journey to the north. A range of high mountains here skirts the Zambesi, up which we had to climb in order to reach the Manica plateau. We reached the base of the hills on the 17th, and on the 19th arrived on the plateau. The path took us in a north-westerly direction. At this season, after a fortnight's heavy rains, the country looked charming; the grass had shot up to a foot or eighteen inches in height over hill and dale, every tree and shrub was in full leaf, and all around looked green and fresh. A large proportion of the trees and shrubs on these hills bear sweet-smelling and handsome blossoms, and I noticed more small wild flowers than I have seen in any other part of the country that I have yet visited. The table-land formed great open plains, or rather rolling downs intersected by ranges of low hills. I estimate the altitude we reached at 3500 feet above the sea-level. The temperature was delightful, quite fresh and cool after the sultry, stifling heat of the Zambesi valley. Continuing our march, we arrived on the 21st of December at Chorumbane's town, situated on the little river Maiyune. We suffered much during the next few days from the drenching downpours of rain and the scarcity of provisions, finally suffering actual hunger; there being a famine in the land, little could be obtained from the starving natives. On the night of the 1st of January, 1878, we slept on the banks of a little rivulet called Calola, which runs towards the Kafūkwe, and on the 2nd walked 15 miles further to the Kembé. Thus travelling by short daily stages we reached the town and kraal of a chief named Sitanda; and from this point the impossibility of procuring food, and illness brought on by hunger and exposure compelled us to retrace our steps. My companion, Mr. Owen, fell ill of fever and rapidly became so much worse that he was obliged to be carried; I afterwards fell ill myself, and our prospects in this inhospitable country, many weeks' march from the nearest civilised settlement, were very dreary. Sitanda, situated on the southern edge of the swamps of the Lukanga river, to which we had descended from the Manica plateau, cannot be more than 120 miles distant from Lake Bangweolo; and I regretted being unable to continue my journey in that direction. Our march back to the Zambesi was very painful. We reached the river on the 18th of February, and on the next day were kindly received by Senhor Mendonça on his island Cassoko. The state of my companion compelled us now to make all speed possible across the Matabele country to Inyati, the nearest station of traders and missionaries, where alone help could be procured. We travelled along the left bank of the river until past the mouth of the Sanyati, and then crossed and commenced our march straight across country to the south. On the way we crossed the Manyako and the Oomay, and proceeded a short distance along the Sengwe, three southern tributaries of the Zambesi not previously shown on any map. On the 15th of April I was obliged to leave Mr. Owen with the best of our native servants at a small settlement on a tributary of the Oomay, and push on alone by forced marches to Inyati, which I reached on the 4th of May. The Rev. W. Sykes at once exerted himself to the utmost to get men to go to the relief of Mr. Owen, and two days after my arrival seven men started for the place where I had left him, carrying all supplies and provisions that were necessary. Happily they found him alive, and succeeded in bringing him on to Inyati, where he was soon in a fair way to recovery.

2. The River Chobe.

I now take the liberty to send you an account of the rise of the Chobe and other rivers in the interior, which has been observed to occur during the dry season, and quite independently of the rainfall, which regulates the rise and fall of the Zambesi and all the rivers to the eastward of the Victoria Falls. In the year 1879 I reached, in the beginning of June, the bed of reeds into which the Mababe river runs. The water was then just commencing to rise. On the 18th of June, in company with two friends, I left the waggons, carrying ammunition and provisions for a three months' elephant hunt in the country to the north, which is infested with tsetse fly. After a three hours' walk in a southerly direction, along the edge of the reed-bed into which the Mababe empties itself, we came to some Masubia towns (these people are refugees from the tyranny of the Barutse, and are at present living under Khame's protection). We here crossed the Mababe, which was running in a well-defined channel, about 15 yards broad and from 3 to 4 feet deep, with a strong current. Now this considerable stream of water, which until the end of September kept increasing daily in volume, simply runs into a large round bed of reeds, and disappears. It is true that the water did run out over the flat, to a certain extent beyond the reed-bed, and when at its highest (at the end of September) had advanced nearly a mile beyond its limit in the beginning of June, when the water first began to rise; yet, unless the main body of the water is absorbed into the spongy surface of the reed-bed, one would expect a river of the dimensions I have mentioned above, which runs day and night with an ever-increasing stream for nearly four months, to flood the whole country.

The following morning (June 19th) we crossed the point of the sand-belt, which runs down to the junction of the Mababe and Machabe rivers, and soon afterwards reached the Machabe, here running at the rate of at least five miles an hour, in a deep narrow channel (about 15 yards broad and 4 feet deep), the water beautifully clear. A few miles below where we crossed it, it runs into the Mababe. Where it runs into the Mababe part of its water flows north, forming the Mababe river, which disappears in the reed-bed, as I have described above, and the rest flows to the south into the Botletle or Lake river. This part of it is called the Tamalakan; so that the Tamalakan and the Mababe are one and the same river, though that part of it called the Mababe flows to the north, and that part called the Tamalakan to the south. As far as I can make out from the natives, this Machabe river runs out of the Chobe a long way up on the other side of Mtembanje's town; at any rate its waters rise and recede at the same time as those of the Chobe, so that it must, I think, be connected with that river. It (the Machabe) is the main feeder of the Botletle river, through the Tamalakan; so that the rise of the Botletle river and the volume of its water depend upon the state of the river Chobe. Last year the Chobe did not rise so high as it did in 1877, and nothing like so high as it did in 1874, and the natives say they have never known it so low, when at its highest, as it was this year, which was on September 22nd.

Last year, too, for the first time within the knowledge of the natives, the waters of the Botletle did not come within 10 miles of the Makalakas, who are living under Khame, near his old station, and as they are dependent upon it to irrigate their gardens, they lost all their crops. This is another proof that through the Machabe and Tamalakan the Botletle receives the main portion of its water from the Chobe.

After following the course of the Machabe for about 10 miles it became at least four times as broad as it was where we crossed it first, and appeared to be just as deep. On the second day it opened out into a broad marsh, in which the river itself could not be seen. All the lagoons through which we had to wade were from two to four feet deep, and the water was running into them at a most astonishing rate.

I should much have liked to have followed the course of this river until I found out whether it really came out of the Chobe or not, but I could not afford to do so, for we found no elephants along its banks, but a great many Kafir hunters from the Lake Ngami, all of whom told us that there were many more of their people on ahead, and as I was hunting for ivory, and had debts to pay outside, I thought it better to cross the sand-belts and look for elephants on the Chobe, where I did not think there would be so many native hunters. Now, I should like to know what is the cause of the Chobe rising during the dry season, for I consider that, like the Sunta, the Machabe, the Mababe, the Tamalakan, and the Botletle, all are dependent on the Chobe, and I include them all when I speak of that river.

The Okavango river, from all that I have heard from intelligent hunters who have followed its course for a very long distance in search of elephants, must rise somewhere near the sources of the Chobe, and as, in common with that river, its volume increases during the dry season and diminishes about the end of September, it probably rises in the same country and is subject to the same influences as the Chobe. According to the latest maps the sources of the Chobe must be very nearly in the same latitude as those of the Zambesi, yet the waters of the Zambesi fall steadily, after the rainy season is over, during the whole winter, until the following rainy season, whilst the Chobe commences to overflow and flood the flat, marshy country through which it runs, soon after the rainy season is over, and is at its highest towards the end of the dry season, at which time of year the weather is intensely hot. At first sight, since the volume of water increases as the weather becomes hotter, one would be inclined to think that the Chobe had its sources among high mountains upon which the snow lies until the latter end of the dry season, which is the hottest season of the year; but this cannot be, for mountains of that altitude would most certainly have been seen by the Mambaris (natives from the west coast, trading for Portuguese masters) who annually come down the Chobe and Zambesi to trade for slaves and ivory, and through them would be known to the Portuguese living at Benguella. The overflow of the Chobe seems to be growing less year by year. In 1874 an immense extent of country was under water during the months of July, August, and September, which was dry land in the same months of 1877 and 1879.

The river Sunta, which is not a tributary but merely an outflow of the Chobe, was very full, and the water was running strong in September right up to and past Goh-ha Hill, where the river is called "Sambutee"; but last year the water only came up to a little distance beyond Sekumbwa's town (these places I have marked on the map which I enclose). Higher up the Chobe, between the marsh where the Sunta runs out of it, and Mai-ini's town, there are in many places large alluvial flats, over which the water of the Chobe spreads in the form of lagoons, as it rises higher and higher. Across these flats the natives make dykes, about two feet high, in order to catch fish, which swim over them when the water is flowing up, and do not think about swimming back when the water is receding, until it has got down to the level of the dyke, when of course they are left in a pool of water which every day becomes smaller and smaller, until at last, if not caught before by the natives, they are left on dry land. Last year the waters of the Chobe never came within a mile of the furthest dykes. In April and May 1863, according to Mr. Baines, the Tamalakan was very full, and where it ran into the Botletle its waters ran both to the south-east and to the south-west. Last year the Chobe did not begin to flow, and the Botletle fed by the Tamalakan did not begin to rise, until the beginning of June. In former years the Botletle used to rise so high every winter that its waters ran into and sank away in the large salt-pan called N'twe-twe; of late years it has never reached the salt-pan, and last year, as I have said before, failed for the first time to reach the gardens of the Makalakas, so that it seems as if the flow of the Chobe is becoming more limited year by year. I do not know whether this statement of the fact that the waters of the Chobe increase in volume steadily as the dry season advances, whilst the Zambesi, which runs parallel to it, and all other rivers in the country are getting drier day by day, will have any interest for you, the more especially as I can offer no theory to account for it, but I thought it might, which is all the excuse I have to offer for sending you such a lengthy letter.

The map which I enclose I have simply made up from a number of little sketch maps which I made last year, by taking the compass bearings from one place to another according to the direction the Bushmen and Makubas pointed, and have regulated most of the distances, when the line was good, by the time it took to walk from place to place by watch.

The course of the Machabe and the river that runs close past Moremi's town are quite supposititious, and may turn out to be completely wrong, as they are merely sketched in according to what the natives told me; and though of course there are instances of Kafirs telling the truth, they are very unreliable. The distance between Mai-ini's town and Mtembanje's is also imaginary. "Rulph," an intelligent Colonial Bastard, hunting for Mr. Westbeech, told me that it was ten days' easy walk, and four days further to Lebebe's. Mtembanje, Mai-ini, and Memele were three Makololo Indunas of Sebituane's, whose business was to look after the drifts (i. e. places where a canoe can get from one bank to the other, perhaps, as at Memele's, by a five hours' paddle through narrow intricate channels running one into the other through the marsh).

When the Barutse destroyed the last of the Makololo, these three Indunas fell victims amongst the rest, and Sepopo (the new king of the Barutse) then told the three men at present looking after the drifts, who had been slaves of the Makololo Indunas above named, to assume the names of their masters, and guard the passes by which an enemy might cross the river, as they had done before them. Chobe, which is the name that Dr. Livingstone gave to the river, and which seems to have been universally adopted by modern geographers, conveys no meaning to any of the natives living along its banks, who as a matter of fact have no name for the whole river, but call it Linyanti in the neighbourhood of that town, and many other names at different parts of its course, but the name Chobe is absolutely unknown. Machabe is only the name of the river close to where it runs into the Mababe, and 20 miles further on they had another name for it. I will send you before long some vocabularies in the Batonga, Masubia, Macuba, Makalaka, and Mashuna dialects. As for the map, the chief places, such as Linyanti, the Lake Ngami, the course of the Botletle river, the Zambesi, and the Victoria Falls, I have copied from Mr. Baines' latest map; the other places I have filled in myself, judging the distance by the relative times it took me to walk from place. I had no instruments, and could not have used them if I had; I mention this, because should you think it worth sending to the Geographical Society, I wish it to be understood that it does not pretend to be correct in any way, but is simply a rough sketch of the country through which I have travelled in search of elephants in the years 1874, 1877, and 1879.

I was intending to cross the Zambesi again this winter, and endeavour to strike through the Mashukulumbwe country to the Kafūkwe river, and follow it as far as possible, and then try and strike across to Lake Bengweolo, and from there to Lake Nyassa. Starting in the healthy season, instead of the unhealthy as I did last time, and with a few donkeys to carry my things, I believe I could carry out this plan unless I met with hostile natives who opposed my entry into their country by force. Now, however, I have given up all idea of making this attempt, for the reason that the administrator of the Transvaal has refused to let me have any powder, and without a good supply of powder it would be useless to undertake such a trip; this is the main reason, but besides this I have been very ill at the Diamond Fields for the last six weeks, and am still very weak, and the doctor strongly dissuaded me from going a long journey on foot. I am, therefore, only going to the Matabele and Mashuna countries this year, and at the end of the year shall return to England.

GEOGRAPHICAL NOTES.

M. de Brazza's Journey from the Ogowé to the Congo.—In the report of the proceedings of the Geographical Society of Paris, January 21st, contained in the present number, p. 181, will be found the telegraphic account of the important journey accomplished in July to November last by this enterprising and successful traveller, from the Upper Ogowé to the middle course of the Congo. He founded, on behalf of the French branch of the International African Association, a station on the Congo, in the navigable part of its course, and descended the river to the advanced post established by Stanley, about 30 miles east of the foot of the Yellala Falls.

Livingstone (Congo) Inland Mission.—In his last Anniversary Address,* Lord Northbrook, it will be remembered, alluded to the fact that a missionary party under Mr. A. McCall, sent out by the Livingstone (Congo) Inland Mission, was about to work its way to the Upper Congo, by following the north bank of the river; and in the Report of the Council † it was announced that Mr. McCall had been assisted with a grant of instruments to enable him to make scientific observations. News has lately been received of the arrival of the expedition on the Lower Congo, the erection of a permanent station at Mataddi Minkanda, opposite Mr. H. M. Stanley's first station at Vivi (or M'Vivi) at the foot of the Yellala Falls, of the despatch of the baggage of a pioneer party overland to Banza Montega, 50 or 60 miles further up, and of the progress of Mr. McCall's party towards Manyanga (about E. long. 15°, S. lat. 15°), from which, at the date of the last letters, they were distant only three days' march. Mr. McCall is accompanied by Messrs. Clarke and Lancely, and he entertains hopes of being able to reach Stanley Pool this autumn, but in view of the rainy season and the difficulties of transport, it is to be feared that these will hardly be realised.—It is intended to send out a fresh expedition next spring to establish a station at Banana, as a base of supplies for the parties further in the interior, as well as a small vessel for the navigation of the Lower Congo.

French Expedition from the Senegal to the Niger.—Much anxiety has for some time been felt respecting the position of Captain Gallieni's expedition, no direct intelligence having been received from the members of later date than May last, as recorded in our September number.‡ Information, however, has lately been received confirming the reports brought by traders to St. Louis that the party was in safety at Nango, a village a short distance from Segou-Sikoro, which had been assigned to them for their residence by the Sultan Ahmadu. On December 28th, Lieut.-Colonel Desbordes, commanding the surveying expedition before referred to,§ received at Medina a long communication from Captain Gallieni, dated October 25th, which has been forwarded to the Minister of Marine at Paris. Captain Gallieni in his report says that he crossed the Niger on May 15th, and left the village of Turella on the following day to continue his march to Segou, through a district belonging to the Bambarras, but acknowledging Ahmadu's authority. The Sultan, as we have said, assigned them as their residence the village of Nango, which is a short day's march from Segou, and it was only after two months spent in conferences and discussions that Captain Gallieni succeeded in removing the Sultan's distrust of the objects of the expedition; but subsequently almost daily interviews took place at Nango between him and the Sultan's most trusted minister. Ahmadu is stated to be well disposed towards the French, and to be willing to allow them to navigate and trade on the Niger. The members of the expedition have suffered much from violent attacks of fever, and the difficulties of their isolated position were much aggravated by the want of quinine and other medicines. At the date of the report, however, they were in tolerably good health and were impatiently waiting to be allowed to return to the coast. Captain Gallieni seems to think that the Sultan will let them go as soon as he has reduced the insurgent Bambarras to subjection, and he expresses a hope of being able to leave Nango in December and reach Medina early in February.

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* Vol. ii. p. 413. † Ibid., p. 443. ‡ Ibid., p. 562. § Ibid., pp. 628, 690.

The Missionary Expedition to Umzila's Country in S.E. Africa.—Through a letter addressed by the family of one of the missionaries to Sir Bartle Frere, we hear of a serious misfortune which has befallen Père A. H. Law and his companions, on their way* from Gubuluwayo to Umzila's country. Père Law and three other missionaries set out from Matabele-land, on their journey, on the 2nd of last June. They had with them six negroes of different tribes and two Matabele guides, furnished by Lobengula, and they travelled in a large waggon drawn by sixteen oxen. On the 29th of June, Père Law wrote that all was going well and that they were then in 19° 2′ S. lat., about 30 miles from the Sabia river. A letter from Père Croonenbergh, dated Gubuluwayo, November 2nd, thus describes the subsequent course of events. About a fortnight previously there was a rumour that a white man had been robbed in the country of the Mashonas, his waggon carried off, and himself abandoned without resources in the desert. Lobengula sent to make inquiries, and on their return his messengers brought word back that Père Law and his companions had been robbed and left in a state of destitution by the Mashonas. At Tati, however, it was thought that the robbers belonged to the Amatongas, a division of the Mashonas living between Sebumbum and Umzila's kraal. After wandering about without food and without guns, the missionaries were at last met by Lobengula's men, and taken on to Umzila's town, where the people refused to receive them or give them food. Lobengula's messengers and the guides, however, proved faithful, and procured them means of sustenance, but tried to persuade them to return to Matabele-land. Père Law, nevertheless, persisted in remaining, and the messengers reported that Umzila had promised to procure the restoration of the stolen property. Lobengula is stated to have been much annoyed at what had happened, as Père Law was a great favourite with him. Mr. Grant, an English trader at Gubuluwayo, who has great influence with Lobengula, was shortly about to start for the Matabele frontier with four more missionaries and fresh supplies for Père Law's party.

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* Vol ii. p. 694.

Heights of Places in Matabele-land.—Père Croonenbergh has communicated, through Mr. A. C. Bailie, Government Land Surveyor at Cape Town, the following altitudes determined by the missionary party in the Matabele country:—Chakanipan, lat. 22° 46′, 3658 feet; Gokwe river (drift), lat. 22° 3′, 3074 feet; Tati, lat. 21° 28′, 3400 feet; Lee's Castle, lat. 20° 33′, 3500 feet; Gubuluwayo, lat. 20° 16′, long. 28° 44′ 26″, 5342 feet; Martin's House, Gubuluwayo, 5347 feet. Père Croonenbergh is anxious that the Goldberg at Tati, 3400 feet, or one of the neighbouring hills, should receive the name of Mount Moreau.

The Nyanza Missionary Expedition.—Among the letters lately received by the Church Missionary Society from members of their Nyanza Expedition are two from the Rev. G. Litchfield and Mr. J. M. Mackay, written from Uyui, Unyamwezi, in June last. Early in the year Mr. Litchfield had started from Mtesa's capital in order to consult Dr. Emin Effendi at Lado, in consequence of the failure of his health, but he was unable to get down the Nile, being stopped by Kabba Rega, king of Unyoro, who seized Mruli and other posts vacated by the Egyptians after Colonel Gordon's departure. He returned to Rubaga, and in April crossed Lake Victoria, in company with Mr. Mackay, on his way to Mpwapwa to consult Dr. Baxter. They reached Kagéi on May 11th and Uyui on June 5th. Mr. Litchfield mentions having found at Kagéi a party of Roman Catholic priests, all sick, and with a caravan much reduced by *hongo*, who were on their way to Kaitaba's, in Uzongora, on the west coast of the lake. During his stay in Uganda, the great anticipations which were based on Mtesa's supposed friendliness to foreigners do not appear to have been realised, and Mr. Litchfield says that his word has never been kept, that no promise of his for good has ever been fulfilled, and that his one aim is temporal gain, and especially munitions of war. The missionaries at Rubaga had been obliged for some time past to part with their personal clothing, piece by piece, to supply themselves with the necessary meat and food for daily existence, and the object of Mr. Mackay's journey to Uyui was to obtain a supply of cloth and beads. —In his letter Mr. Mackay says: "It is very hard to say how we stand with Mtesa. I myself have seldom gone to court since the formal rejection of our teaching at Christmas last.' As I fully expected, the decree then passed was only a temporary affair. My own pupils, at all events some of them, never ceased coming, and gradually chiefs and others . . . resumed their visits and friendly relations with us." Mr. Mackay says that the main concern of the missionaries has been with the language, and that they have made considerable progress in it. In a postscript to his letter, Mr. Mackay observes that *Uganda* is the Kiswahili name for the country, but that everywhere north of the lake the correct pronunciation is Buganda; and, in like manner, Busoga, Bunyoro, Buzongora, for the other neighbouring countries.

Colonel Prejevalsky.—The eminent Russian traveller and savant intends, we are informed, to devote himself for some time to the preparation in retirement of a great work on the results of his travels, including, besides his recent expedition to Tibet, his previous journey to Lob-nor, of which he was prevented, by want of time, from giving more than a bare outline. The work is to consist of eight volumes, and to be entitled 'Travels in the Deserts of Central Asia.' Volumes I. and II. will contain the narrative and an account of the physical geography and ethnography of the countries he has visited, and will include also his surveys, the pictorial illustrations being from original sketches by his companion, Lieutenant Robarofsky. Volume III. will be devoted to the mammalia of Central Asia; Vol. IV. to the birds; Vol. V. to the reptiles, amphibia, and fishes: Vol. VI. to the flora of Mongolia; and Vol. VII. to that of Tibet. Vol. VIII. and last will contain the geology and mineralogy as far as materials will permit. The first two volumes, each containing 500 pages, and perhaps more, will be written by the traveller himself, and will appear towards the close of 1882. The ornithology will also proceed from his pen, as well as that portion of the zoology which treats of the antelope, buffalo, and a few other of the more important animals. The remainder will be written by the academicians Strauch and Maximovitch, professors Kepler, Inostrantsef, and Bogdanof, and will be issued in parts. The whole will not be completed for several years. The work will be brought out under the auspices of the Geographical Society, and a special grant for the purpose will be asked for from H.M. the Emperor.

Projected Exploration of the Central Gran Chaco.—An expedition, under Lieut.-Colonel Juan Sola, is about to undertake an interesting journey of exploration in the basin of the Parana. The party will ascend the Rio Vermejo as far as its bifurcation, and advance as far as possible along the Teuco canal. The first part of their programme will be a thorough examination of the banks, bed, current, &c., of the Teuco canal, with a view to navigation and colonisation. The expedition will go as near Oran as possible by the Vermejo, and it is thought they will succeed in reaching the confluence of the Vermejo de Tarija, and ascend that affluent nearly to Tarija. Another important part of Colonel Sola's programme will be the exploration of the Rio San Francisco, formed by the confluence of the Lavayen and the Rio Grande de Jujuy, both of which streams will also be ascended at any rate for some distance. Colonel Sola will afterwards return to Fort Dragones, whence he will proceed by land to the banks of the Pilcomayo, following as nearly as possible the meridian of the Fort. From the Pilcomayo he will make for the Vermejo, taking a route parallel to and to the eastward of his former route. He will then traverse in different directions the large and unknown tract of country between the Pilcomayo and the Vermejo, which is known as the Central Gran Chaco. One of the principal results which will follow the completion of Colonel Sola's explorations, will be the formation of colonies on the right bank of the Pilcomayo, and on the left bank of the Vermejo. Much gain to science is also expected from this expedition, especially in regard to geography, topography, and hydrography, as well as in the departments of botany and zoology.

Islands of San Ambrosio and San Felix.—These two islets of the South Pacific were very carefully surveyed by the Chilians in 1874, a fact which is not mentioned in the Hydrographic Notice published by the Admiralty (No. 23, 1 Aug. 1880); to which reference was made in our February number.* These islands, in 26° 19′ S., were discovered in 1574 by the pilot Juan Fernandez, the famous navigator who first showed the course to be taken in a voyage from Peru to Chile against the south wind. They were formerly called "las Islas Desventuradas." In 1789 they were visited by the Spanish frigate *San Pablo*, and in 1793 by the English whaler commanded by Captain James Colnett, who landed with great difficulty. Subsequently Dumont D'Urville touched at them, and also Du Petit Thouars in the French frigate *Venus* in 1843. Don Leoncio Señoret, in the Chilian schooner *Colocolo*, was at the island in 1841; Lieutenant Parkins, of H.M.S. *Portland*, landed on San Ambrosio in 1850 to see if there was any guano, and Captain Simpson, of the Chilian corvette *Chacabuco*, was there in 1868.—The survey of San Ambrosio and San Felix was executed by Captain Vidal Gormaz, in the gunboat *Covadonga* in 1874. His Report is an exhaustive monograph on the islets, with botanical and geological notes and illustrations.

Dr. Otto Finsch's Explorations in Polynesia.—Our former notice of this naturalist traveller recorded his proceedings in the Sandwich and Marshall Islands.† The last letters received from him announce his arrival in New Britain, where he had taken up his residence in the little island of Matupi, situated in Blanche Bay, near the north-eastern extremity of the larger island, as marked in Mr. Wilfred Powell's map published in our last number.‡ In February and March 1880, Dr. Finsch visited the principal islands of the Caroline group, and made large collections in every branch of natural history. During a previous short excursion to the Gilbert Islands, Dr. Finsch had obtained twenty-three specimens of birds, 300 of reptiles, 1000 of fishes, a large number of crustaceans, butterflies, and Coleoptera, and about 300 ethnographical specimens. Having returned to Taluit (Marshall group) in June last, Dr. Finsch took a passage thence by a sailing ship to Duke of York Island, and paid a visit to Mr. Brown, the well-known missionary of that group. Subsequently he crossed over to his present quarters in Matupi.

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* *Ante*, p. 104.

† Vol. ii. p. 50.

‡ *Ante*, p. 128.

Obituary.

Mr. John Gould, F.R.S.—We regret to have to record the death in London, on February 3rd, of Mr. John Gould, F.R.S., the well-known ornithologist. Our Associate was born at Lyme, in Dorsetshire, on September 14th, 1804, and early in life removed to the neighbourhood of Windsor, where he devoted himself to the study of ornithology. In 1838 he went to Australia, and travelled there in connection with what was not only his favourite pursuit, but the business of his life. The series of magnificent monographs and faunistic works which he published during his scientific career, in folio volumes, illustrated under his direction with consummate artistic skill and technical knowledge, will remain a durable monument of his scientific activity. At the time of his death he was engaged on further works illustrating the birds of Asia and New Guinea. He was considered one of our principal authorities on the birds of Europe, and the greatest authority on those of Australia. Mr. Gould had been a Fellow of our Society since 1846.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Fifth Meeting, 31*st January*, 1881.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*Septimus Brocklehurst, Esq.*

ELECTIONS.—*Adam Hay Anderson, Esq.; F. J. Campbell, Esq.; Guy Marshall Campbell, Esq.; David Chapman, Esq.; Rev. William Atherstone Hales; Charles Alex. Hardman, Esq.; Walter Herbert Ingram, Esq.*, B.A.; *William Francis Lawrence, Esq.; William George Lock, Esq.; Theophilus Burnand Lodge, Esq.; Sir Louis Stuart Jackson; John Oates, Esq.; Ottley Lane Perry, Esq.; Septimus Payne, Esq.; Robert Ryrie, Esq.; William Alcock Tully, Esq.*

The following paper was read:—

"A Journey to Semirétchia and Kuldja in 1880." By E. Delmar Morgan, Esq. (*ante*, p. 150).

Sixth Meeting, 14*th February*, 1881.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*Rev. Henry Lowther Clarke; James Cleminson, Esq.; Rev. Henry Cooper; Captain R. H. Fawcett*, 33rd Foot; *Lord Edmond Fitzmaurice*, M.P.; *Hon. Henry Fowler; F. L. James, Esq.; William D. James, Esq.; William C. James, Esq.; Lieut.-General Sir Frederick Roberts*, V.C., G.C.B., &c.; *Sir Francis Smith*, Knt.; *M. Slevogt; Joseph Thomson, Esq.*

The paper of the evening was—

"Saráwak and North Borneo." By William M. Crocker, Resident, Saráwak. (Will be published in the April number.)

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—January 21st, 1881: Colonel PERRIER, of the Institute, in the Chair.—Colonel Perrier expressed his thanks for the honour which had been done him in appointing him President of the Central Commission, and hoped that by the kind indulgence and generous support of the Society he should be enabled to perform his duties satisfactorily. He then announced that

MM. Daubrée and D'Abbadie had been elected Vice-Presidents, M. Maunoir General Secretary, and Dr. Harmand and Professor Paquier Assistant Secretaries.—M. Gauthiot mentioned that two days before his death M. Lucereau had written to the Society of Commercial Geography from Harar two long letters, which will be published, and which probably contain the last intelligence from the unfortunate traveller.—It was announced that this year's meeting of the French Association for the Advancement of Science would be held at Algiers from April 14th to 21st.—A letter from M. Baux at Shanghai was read, furnishing some particulars of a journey lately made by M. Rocher, who not long since published a book on the Yünnan province.* M. Rocher, it appears, had been requested by the Chamber of Commerce at Lyons to institute inquiries into the silk industry of the Kiangsu and Chekiang provinces, and he seems to have encountered some difficulties in carrying out his mission, owing to the illiberal spirit in which the Treaty of Tientsin is interpreted by the local authorities.—In a letter from Bunder-Maraya, M. G. Revoil announced that on September 23rd he had been able to start on a trip into the Mijjertain country, but that he had found the region traversed rough and broken, and had been obliged to content himself with laying down his route by compass bearings, occasionally taking observations with the sextant and artificial horizon. In a letter of later date, November 17th, M. Revoil states his intention of starting for Bunder-Gâzem, where he hopes to be able to organise a caravan, but should he fail, he will leave the Mijjertain country for that of the Wursumgalli.—In a letter from Tashkend, dated October 9th, M. de Ujfalvy expresses a hope of being able to accomplish his journey to the Pamir this year; he intends to visit Darwaz, where no European has previously been.—News was also given of the movements of M. Ch. Huber, a French traveller in Arabia.—The Chairman referred to the services rendered to science by the well-known Egyptologist, M. Mariette-Bey, whose death had just taken place in Egypt.—M. Duveyrier was charged with the communication of the good news which had been received from M. Pierre Savorgnan de Brazza in a telegram, sent by way of Madeira, to M. de Lesseps, President of the French Section of the International African Association. The telegram contains very important intelligence, and, in the opinion of MM. Maunoir and Duveyrier, should be interpreted as follows: "(Au mois de) Juillet (j'ai) atteint (par la) route (de) terre (le) Kongo, entre (le confluent de la rivière) Mpaka-Mpama (et celui de la rivière de) Lawson . . . . , par (l') influence pacifique (du roi) Makoko. (J'ai passé par la territoire des) Oubandgi (et des) Apfourou (et j'ai fait une) descente pacifique de la Kounya-Alima (en) pirogue (jusqu'au) Kongo. (Le) 3 Octobre (1880, j'ai) fondé (la) station (Française de) Ntamo-Nkouma sur (un) territoire cédé par (le) roi Makoko à (la) France. (Le) sergent Malanime (et) trois laptois (en) composent (le) personnel. (En) Juillet (il y aura) urgence (de) ravitaillement. (J'ai) reconnu (la) route direct entre (la) station (de l') Ogowé et (la) station (de) Nkouma. (Le voyage de l'un à l'autre s'est fait en) douze marches, (dont les) cinq dernières dans (l') État (de) Makoko. (La) route (court) sur (un) plateau (de) 800 (mètres d') élévation, communiquant (à) 60 milles sud-est (de la) station (de l') Ogowé. (Il y a) deux descentes (de gradins de ce) plateau pour (arriver au) gué (de la) rivière Mpaka-Mpama. (Jusqu'à la rivière) Lefini-Lawson (la) route (est) facile (pour les) ânes. (La) possibilité (de) portage indique (un) ravitaillement facile. (Le) pays (est) sain; (la) population dense (et) pacifique. (Au mois de) Novembre (je suis) arrivé (à) Mdambi-Mbongo, poste avancé (de) Stanley. (La) route (du) Kongo (est) impossible pour (le) ravitaillement (de la) station (de) Nkouma. (Signé:) Brazza." Commenting on M. de Brazza's telegram, M. Duveyrier spoke as follows: "His journey of discovery from the

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* See 'Proceedings,' vol. ii. p. 391.

Ogowé to the confluence of the Kunya-Alima with the Congo possesses an historical importance. He is the first European traveller in Equatorial Africa who has penetrated into the interior from the West Coast, all great discoveries in this region having been previously made by explorers who started from Zanzibar and the East Coast, where the populations are not, as on the West Coast, tribes harassed and pent up by attacks from the interior, as well as weakened by a long struggle for existence. M. de Brazza succeeded in passing the difficult zone, and, contrary to the experience of his first journey, he found himself, when once beyond this zone, among people of a pacific disposition, whom we may hope to civilise by commerce. It appears from the telegram that the streams discovered by him during his first expedition to the east of the Ogowé basin, and notably the Alima, are really affluents of the Congo. Not only has M. de Brazza founded a first French station on the Ogowé near Mashogo, but now, thanks to his perseverance and energy, there is another on the Congo itself at Ntamo-Nkouma, that is to say, to the east of Mr. Stanley's advanced post. The French Committee of the International African Association could not have made a more happy choice than they did in selecting M. de Brazza for the duty of founding the first French stations in Western Equatorial Africa; and it will not be out of place to remark that that of Ntamo-Nkouma is the furthest European establishment in the interior. We must also pay particular attention to that passage in M. de Brazza's telegram where he speaks of the advantages of the route he has opened over that of the Congo, which is interrupted by cataracts and rapids, for giving access to peoples possessing a certain amount of organisation. It follows that the river Ogowé, with the basin of which the explorations of MM. de Brazza, Ballay, and Marche first made us acquainted, is the key to the interior. On his arrival at Mr. Stanley's advanced post the mission confided to M. de Brazza by the French Committee of the International African Association came to an end, but he will not yet return home. Indeed, in company with Dr. Ballay, he is about to undertake a new and important journey of discovery, thanks to the means so liberally placed at the disposal of the Minister of Public Instruction by the Assembly, after the eloquent address of our colleague, M. Georges Perin."—M. de Quatrefages read to the meeting the following telegram, dated Brussels, January 15th, which he had received from M. Strauch, the General Secretary of the International African Association:—"Nous recevons de notre agent au Congo la télégramme suivante que nous nous empressons de vous communiquer: 'Brazza a atteint Stanley Pool en Septembre, venant de l'Ogowé; a rencontré Stanley 7 Novembre; arrivé Vivei (Vivi) 12.' Nous adressons nos chaleureuses félicitations au Comité Français et à la Société de Géographie de Paris." After a few remarks upon the successful achievement of M. de Brazza, M. de Quatrefages put it to the meeting that the new settlement on the Congo should be called "Brazzaville," in honour of the explorer, a suggestion which was received with loud applause.—M. Duveyrier gave some news of Colonel Flatters' expedition in the Central Sahara. According to a letter dated December 17th, 1880, he intended to move towards Wad-el-Messeguem, in order probably to pass between the Ahaggar and Tasili plateaux, in the country of the Northern Tuaregs. The caravan was in excellent health, and the weather was favourable for marching.—Dr. G. Le Bon read a paper on the Tatra Mountains, chiefly having reference to the region at the foot of the Galician slopes, which possesses some interest from the standpoints of ethnography and geography, owing to its inhabitants having remained in a peculiarly isolated condition.

——— February 4th, 1881: Colonel Perrier, of the Institute, in the Chair.—The Minister of Public Instruction communicated a letter from Dr. Crevaux, giving information of the existence of beds of oil in a large tract of country in the Colombian

Cordilleras, near the Isthmus of Panama. The sketch map which accompanied the letter, was communicated to M. de Lesseps, who was present at the meeting.—A letter was read from M. Edouard André, who in 1875–6 was engaged on a mission in South America, offering some remarks on M. Wiener's recent journey from Quito to the Pacific coast. M. André stated that M. Wiener was not the first to traverse the route then followed, and referred to the researches of the German geologists, Reiss and Stübel, and of Sr. Menten, the founder of the Quito Observatory. M. André further stated that he had in his possession a map which shows the line followed by M. Wiener, known at Quito as the Manabi road. The letter is to be published in the Bulletin of the Society.—In a letter, dated Orenburg, January 23rd, M. de Ujfalvy announces that General Kaufmann has informed him that he cannot be allowed to penetrate beyond Karategin, as Darwaz is at war with Bokhara. He intends, in consequence, to direct his steps towards Merv. M. de Ujfalvy furnishes details regarding his anthropological and linguistic work since leaving Tashkend, and concerning his stay at Kazalinsk, where he has studied the curious remains of the irrigation canals of the Kara-Kalpacks. He finds that a great change has taken place in Turgai and the province of Uralsk during the past three years. Numerous Kirghiz villages have been founded along the watercourses and the post-road, giving a totally different appearance to the steppe, which but lately was an arid desert.—M. Bardey communicated a copy of a report from his agent at Harar respecting the murder of M. Lucereau.—M. de Quatrefages read extracts of a letter from M. Huber, dated Kheibar, December 6th. M. Huber, who thought that he was the first European to penetrate into this part of Arabia, has discovered that he was wrong, and that an Englishman, calling himself Khalil, had just traversed the very same region. The climate, he says, is dangerous for white men. He mentions the existence of a watercourse, the Wad-Ermek, which traverses this part of Arabia as far as Bassorah —a fact which is denied in the most recent works on Arabia. From Kheibar M. Huber intends to go to Jeddah, after making some excursions to the north-west and south-west, and thus concluding the exploration of the whole of Northern Arabia.—M. de Quatrefages afterwards gave a summary of a lengthy communication from Dr. Montano, who is now engaged in exploring the south part of Mindanao, the most southern of the Philippine Islands. The traveller commences by giving details respecting the geography, orography, and climatology of the regions traversed, and then passes on to a study of the races. The Malays, as is the case in the whole group, only live on the banks and at the mouths of the rivers; further inland a great variety of distinct races is met with sometimes in a very small space; and negritos are undoubtedly found there. Dr. Montano discusses their intellectual, moral, and religious qualities. Their religion is of a very rudimentary nature, consisting in the belief in spirits, which have the power of turning into a variety of objects; they have, however, no priests or sorcerers. An interesting part of Dr. Montano's long memoir relates to the ascent of the Apo volcano, about 17 miles from Davao, which he made in company with the Governor.—M. Simonin read a paper on a new line of subsidised mail-steamers which is to run from New Caledonia and Australia to Marseilles through the Suez Canal.—The Abbé Durand gave an historical sketch of the journeys of Portuguese travellers in the interior of Africa in the sixteenth century, and of the relations which the Portuguese Government then held with Timbuktu and Senegambia.

——— February 19th, 1881: M. DAUBRÉE, of the Institute, in the Chair.—The General Secretary read an extract of a letter from M. Roche, an engineer attached to Colonel Flatters' expedition in the Sahara, referring to the formation of the sand dunes, all of which, especially those which are isolated, have a north and south (magnetic) direction. He stated that from Wargla the expedition followed the Wad

Moya towards Hassi Inifil, afterwards ascended the Wad Insekki, and at last arrived at Hassi Messeguem (29° 15′ N. lat., 4° 30′ E. long.), where they were on January 4th. They had found by examination that the Tademayt plateau was cretaceous. From this point they will direct their course to Hoggar. The nights were described as very cold, but the days fine.—A report was afterwards read from the French Consul at Zanzibar to the Minister of Foreign Affairs on the present position of European expeditions in East Africa. Seven members of the order of Notre Dame d'Afrique had arrived at Zanzibar in order to establish stations at Metaburu or at Metuana, between those on the Victoria Nyanza and on Lake Tanganyika. They were accompanied by eight laymen of French, Belgian, and Dutch nationality. The first two expeditions which had established themselves at Ujiji, afterwards occupied Bikari, and propose to extend their operations to Nyangwe, the capital of Manyema, on the Congo. The Sultan of Zanzibar had given the newly arrived party a letter of recommendation to King Mtesa. In a postscript M. Ledoulx announces the return of Mr. E. C. Hore to Zanzibar from Ujiji, and also the arrival of two German travellers, who had been ordered by the King of the Belgians to proceed to the Congo. Herr Lindner is in command, and it appears that he is to organise his caravan at Zanzibar, and proceed by sea to the Congo.—M. Germond de Lavigne announced the approaching departure from Marseilles of a party of engineers and others, who are about to make a scientific investigation of the country to the north of the Zambesi, particularly in regard to its mineral products, and would be glad to conduct any inquiries on behalf of the Society.—M. Tournefond gave some explanations respecting a Korean-French dictionary published at Yokohama by the missionaries of Korea, and he also gave an historical sketch of the Korean Mission.—The Chairman announced that this year's medals had been awarded as follows:—Grande Medaille d'Or, to Major Serpa Pinto, for his journey across Africa; Gold Medals to MM. Zweifel and Moustier, for their discovery of the sources of the Niger; Gold Medal to Dr. F. Moreno, for his journeys in Patagonia; Gold Medal to Captain W. J. Gill, Royal Engineers (Gold Medallist Royal Geographical Society, 1879), for his journey in Western China and on the borders of Tibet; and Gold Medal to Mr. B. Leigh Smith, for his voyage to Franz-Josef Land.—M. d'Abbadie called attention to the fact that, according to documents which he had recently received, M. Savorgnan de Brazza had traversed without any description of arms the basin of the Alima and the country of the Cannibals, through which Mr. H. M. Stanley had had to fight his way, and that he had thus shown himself to be the true pioneer of science and civilisation.—Professor Paquier, one of the Assistant Secretaries, afterwards read a paper on the Emperor Baber—the conqueror of India and founder of the so-called Mogul dynasty, who reigned from 1494 to 1534—referring more particularly to his services in connection with the geography of Central Asia.

Geographical Society of Berlin.—January 8th, 1881: Dr. NACHTIGAL, President, in the Chair.—The President announced the safe return of Dr. Oscar Lenz from Timbuktu, and his arrival at St. Louis (Senegal). The immediate departure of the traveller for Europe was prevented by an outbreak of yellow fever among the garrison of the place, which, although it had spared the rest of the population, hindered the steamers from accepting passengers. In the meantime an official report had been received at the Foreign Office from the French Government, according to which Dr. Lenz intends to sail for Europe on the 18th December.—The President also announced that, after a long silence, letters had come to hand from Dr. Buchner in West Central Africa, which contain the most favourable news regarding his health and scientific activity, although the great expectations of the traveller had by no means been realised. The letters were dated—February, 20th May, and 1st July, 1880 (two letters written in January and April being apparently lost), and describe his sojourn in Mussumba, the capital of the Muata Yanvo. The traveller devoted his six months' stay (by no means compulsory) in the capital of this prince, to topographical, natural history, and photographic work, the results of which had already been sent home. In spite of the kindness shown him, he arrived at the conviction that the Muata Yanvo would oppose his further journey to the north and north-east, so he resolved at the commencement of the favourable season to quit the capital (which has been removed since Pogge's visit a day's journey from its former site), under the pretext of returning to Angola, but in reality with the intention of altering his route as soon as he crossed the boundary of the Muata's dominions. This project was duly carried out. After crossing the Lulua river, he wrote on the 1st July from Muene Chikambo, that he had sent back most of his people, together with his collections, to Angola, and that he was on the point of starting for the North with fifty men who had volunteered to accompany him. Among the reports which he had forwarded, his astronomical determinations of places would likely prove of considerable importance, as they would necessitate great alterations in the measurements made by Schütt.—The German East African Expedition, commanded by Captain von Schöler, and the Belgian Expedition under Captain Ramaecker, arrived on the 17th October at Tabora. The march was effected amidst great difficulties and dangers, as the travellers, on account of a war between the chiefs Muiu, Mtuana, and Mdabura, were detained for a long time at Kuko, and were even compelled to side against the latter. As the situation of Maryara selected for a station by the "*Association Internationale Africaine*" has turned out to be very ineligible, being in possession of the chief Nyango, an ally of the notorious Mirambo, the members of the German Expedition at Tabora, after mature deliberation, had decided on founding a station at Kisinda not far from the Gombe river. Time would show how far this project could be carried out. The travellers would soon be able to test its feasibility on the spot.—The President next communicated to the Meeting some details from a letter from Gerhard Rohlfs, dated Massaua, the 12th December. The traveller was about to start for Ailet, from whence he intends to continue his journey under the protection of the Abyssinian general, Ras Alula. Bands of robbers in the frontier districts of Abyssinia, as well as the virtually renewed hostilities between Abyssinia and Egypt, rendered the greatest precautions necessary.—Dr. Kessler then addressed the Meeting on the present state of scientific exploration in the Caucasus, and Mr. Buchta gave a description of the countries of the Upper Nile, illustrated by a series of landscapes and ethnographic subjects, photographed by himself.

——— February 3rd, 1881: Dr. Nachtigal, President, in the Chair.—Speaking in memory of Adalbert von Chamisso, the centenary of whose birth had been celebrated on the 30th January last, the President alluded to him as one of the founders of the Society, and as being distinguished both as a circumnavigator and poet.—According to letters received from the African expeditions, Gerhard Rohlfs and his companion, Dr. Stecker, had left Massaua and had reached the plateau of Abyssinia by most difficult and steep paths, recommended to them for the sake of their own security by the Abyssinian general, Ras Alula, to whom the protection of the travellers had been confided. Starting from Ailet, up to which place they had travelled under an Egyptian escort, they accomplished the ascent to Kasen, situated more than 8000 feet above the level of the sea, without loss of baggage or animals. All along the track the country presented the most savage but at the same time most picturesque aspect. The valleys and mountain slopes were everywhere covered with a most magnificent tropical vegetation, consisting of gigantic sycamores, wild citron-trees, mimosa, &c., densely intertwined with luxuriant creepers; and as day after day the travellers climbed the summits of mountain ranges or descended into deep valleys, the flora and the abundantly represented fauna of the country exhibited the utmost variety. At the date of the letter (30th December, 1880) the travellers were stopping at the village of Kasen, where they were hospitably entertained, and on the following day they expected to meet the Abyssinian general, Ras Alula, at Tsasega. Dr. Stecker at the same time has sent home a detailed description of the country surrounding Massaua, together with meteorological observations, which will shortly be published.—The President also gave a sketch of the journey under the Vicomte de Brazza from the Ogowé to the Congo, where the latter succeeded on the 3rd October in founding a station in the territory of the friendly chief Makoko. Four French soldiers were left in charge of the station. Thence the travellers turned westward, and in the month of November arrived at Mdambi-Mbango, the furthest point reached by Stanley.—A document has been received from the German Foreign Office in connection with the report already handed in during the previous year, and describing the various attempts made during the last three years to reach the mouths of the Siberian rivers by way of the North Cape. In the year 1878 seven ships undertook the voyage to the Arctic Sea; two steamers happily arrived in the Obi, four steamers in the Yenisei, and a sailing vessel in the Lena, and even sailed up that river a distance of 2700 versts as far as Jakutsk. The greater number of these ships came back to Europe in the course of the same season with return-freights. The attempts made in the two following years were less successful. Of seven ships which left in 1879, only one was able to accomplish the voyage round the North Cape. In the year 1880, five ships, so far as is known, penetrated into the Sea of Kara. The two German steamers, the *Luise* and the *Dahlmann*, bound for the Yenisei, were forced to return. The *Dahlmann* encountered to the northward of Novaya Zemlya a sea of ice as impenetrable as that which it had met with on the south side of the island. The ship *Nordland*, freighted by the well-known Russian merchant Sibiriakoff, twice entered the Sea of Kara, but its progress was also stopped by impenetrable masses of ice, and had to return to Europe. This failure by no means discouraged the enterprising merchant, for in July 1880 he himself started for the North in the steamer *Oscar Dickson*, chartered in Gothenburg and provisioned for ten months. He left Vardö in August, arrived in Jugor Strait before the end of the month, but the whole of September was spent in vain attempts to cross the Kara Sea. Later in the year the ship was seen by the captain of the steamer *Neptun* in the Matotschkin Schar, sailing up and down to the eastward of Novaya Zemlya, and one time returning through that strait to the western side of the island. For some time no further news was received of the whereabouts of the *Oscar Dickson*, excepting a rumour that the vessel was frozen-in in the mouth of the Yenisei. In consequence, a brother of the merchant Sibiriakoff sent an expedition overland to the mouth of that river. Subsequently the news came to hand that the lost one had arrived safely at Tobolsk. Only the fifth ship, the *Neptun* already mentioned, reached the mouth of the Obi, and returned in the course of the same year to Europe laden with grain. Although the conditions of navigation in the Kara Sea, according to the experiences of recent years, have disappointed the hopes hitherto entertained, yet we may expect that more exact observations will remove many obstacles in the future. For this purpose, observing stations are about to be established at the mouths of the Lena and Kolyma, or upon one of the New Siberian Islands. Lieutenant Türgens had been appointed to the former station.—Mr. Förster, Director of the Berlin Observatory, then addressed the Meeting on the subject of the outfit and preliminary training required by travellers who wish to make astronomical observations, and announced that the Observatory of Berlin would be prepared in future to instruct travellers in the theory as well as in the practical use of instruments.—At the conclusion, Professor Fritson gave a description of the Boers from his own experience in the Transvaal.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

ASIA.

Blunt, Lady Anne.—A Pilgrimage to Nejd, the Cradle of the Arab Race. A visit to the Court of the Arab Emir, and "Our Persian Campaign." London (Murray): 1881, 2 vols., sm. 8vo., pp. 273 and 283, map, illustrations. Price 24*s.*

The main features of this book have been given by its editor, Mr. W. S. Blunt, in his paper reported in our 'Proceedings' for 1880, pp. 81–102, and partly also in another paper read at the Sheffield meeting of the British Association, briefly abstracted in the preceding vol., p. 685; the greater space, however, of the present work enables Lady Anne not only to elaborate the many incidents of personal interest, but also to give valuable descriptive and topographical details. Mr. Blunt, in the preface, summarises the geographical results, which are the more important, as former European travellers to the Jebel Shammar (Wallin, Guarmani, and Palgrave) were compelled to disguise themselves, whereas he and Lady Anne were on friendly terms with the Arabs, and could make their explorations openly and at leisure, being provided, moreover, with compass and barometer. Palgrave's account of the physical features of the Nefûd and of Jebel Shammar is considered to bear very little resemblance to the reality; and the present author's observations, taken under favourable circumstances, are claimed to be the first of the kind that have reached Europe. The plateau of Haïl was found by careful and continuous barometric readings to be nearly twice the height above the sea hitherto supposed; corrections are also made in the great pilgrim-road from the Euphrates, hitherto known by report, but not rightly laid down on maps; and the map of Northern Arabia given with the first volume of the present work, is to be depended on as substantially accurate. The scale of this map, about 72 miles to the inch, enables more detail of a physical and tribal nature to be inserted than could be given in the smaller map illustrating Mr. Blunt's paper in our 'Proceedings.'

Mr. Blunt himself contributes an appendix on the physical geography of Northern Arabia, which, apart from its clear exposition of the general information of that hitherto insufficiently characterised region, is of particular interest as discussing in some detail (with diagrams) the peculiar horse-shoe shaped hollows, called "fuljes," found in the Nefûd, with other desert phenomena. A large illustration is also given (vol. i. p. 160) of one of these depressions, which run in strings irregularly E. by S. and W. by N., but as to the formation of which Mr. Blunt is unable to offer or accept any explanation as satisfactory. The sharply defined limits of the red sand of the Nefûd plain, the formation of its ridges (which seemingly show that the solid mass of sand is advancing contrary to the wind), and the apparently special laws affecting its coarse material, are pointed out by Mr. Blunt. The Hamád plain, where the great Nefûd begins, is 2200 feet above sea-level; and the latter plain rises to over 3000 feet (in places as high as 3350), ceasing abruptly a little north of 27° lat. (not 29°, as stated in error, p. 245), when unmistakable red granite hills crop up, to a height of 1500 feet. The chief range, Jebel Aja, runs mainly E. by N. and W. by S., and Haïl, 3500 feet above the sea, lies due east of its extreme eastern buttress, not south of it, as hitherto supposed. Mr. Blunt's dead reckoning, both in going from the Mediterranean and returning to Meshed Ali, places Haïl 60 miles further south than it appears in modern maps. He considers that the plateau between it and the Jebel Selman is the highest in Arabia, thus warranting its inclusion in the term Nejd or Highland. Some discussion by good authorities upon this, and upon the true meaning of the word Nejd, occurred on the reading of Mr. Blunt's paper above mentioned; but he adheres to the opinion not only that Haïl is part of Nejd, but Nejd *par excellence*, both from the statements of all the Arabs with whom he came in contact, and from the written authority of various Arabian geographers, and of Niebuhr, Chesney, Wallin, and Guarmani,—Palgrave alone being in (qualified) opposition to this view. The geographical expression Nejd is held to include the lands lying between the great Nefûd visited by Mr. Blunt and the disconnected lesser Nefûds to the south. The geographical name became converted into a political one, with the foundation of the Wahhabi empire, which at one time covered all the highlands; but with the gradual disruption of that power, its area has diminished, until now it is again a mere term of physical geography, practically equivalent to Central Arabia.

Some observations on the fauna, given in the appendix, are but little more extended than those on the subject in our 'Proceedings' above referred to.

Mr. Blunt further contributes an historical sketch of the rise and decline of Wahhabism in Arabia, principally compiled from materials supplied by Colonel Ross, H.B.M.'s Resident at Bushire; and also a memorandum on the Euphrates Valley Railway and kindred schemes of communication between the Mediterranean and the Persian Gulf. In this, he discusses the various possible routes, with their respective mileage, difficulty or facility of construction, and possibility of local traffic or development, judging by the physical conditions of the lands through which they would pass. On the whole, he thinks all to be both politically and commercially unpromising.

Any abstract of the contents of the body of the work is here impossible; the exactness and shrewdness of Lady Anne Blunt's numerous observations on points hitherto necessarily unknown as regards tribal distribution and customs, as well as her fidelity on topographical matters, will cause these volumes to remain of enduring value for referential purposes. The portions referring to the Emir Ibn Rashid and the political constitution of Jebel Shammar are specially likely to be of permanent historical interest.

Various illustrations from her drawings are given, of which some illustrate the physical formation of the more striking parts of the country, and are acceptable as its only existing truthful representations.

Mielberg, J.—Magnetische Beobachtungen des Tifliser physikalischen Observatoriums im Jahre 1879 [also in Russian]. Tiflis (Michelson): 1880, sm. 8vo., pp. lxxviii. & 36.

Rajputana.—The Rajputana Gazetteer. Vol. III. Simla (Government Press): 1880, 8vo., pp. 317.

The first two volumes of this work were noticed in our 'Proceedings' for 1880, p. 781. The present one contains the general topography or geography, history, and political, administrative, social, and economic particulars of the States of Meywar and Partábgarh (by Captain C. E. Yate), Sirohi and Mount Ábú (by Major C. A. Baylay), and Ulwur (by Major P. W. Powlett).

Shore, The Hon. Henry Noel.—The Flight of the *Lapwing*: a naval officer's Jottings in China, Formosa, and Japan. London (Longmans, Green, & Co.): 1881, 8vo., pp. 549, maps, illustrations. Price 15*s.*

Describes the author's experiences during three years' active service in the China Seas, as first lieutenant of the war-ship above named, of which the most important, from a professional point of view, was the stranding of the vessel on the island of Cheng-Shan, in the Pe-chi-li Straits. Mr. Shore, after visiting Hongkong, Canton, and Amoy, went to the south-west of Formosa, and subsequently sailed from Foochow round the north and north-eastern parts of the island, going a little way into the interior. Returning to Foochow, the Gulf of Pe-chi-li was coasted, after stopping at Shanghai; the ship touched at the mouth of the Pei-ho (enabling a visit to be made to Peking), Ning-hai, and Newchang, thence crossing to Nagasaki and returning to Hongkong. A short reprint of a visit to Siam is given in this work, of which the chief interest is its account of the various ways in which western civilisation is being received into the Chinese system. The maps are of the ordinary book-illustrating nature.

St. John, Captain H. C.—Notes and Sketches from the wild coasts of Nipon, with chapters on Cruising after pirates in Chinese waters. Edinburgh (Douglas): 1880, cr. 8vo., pp. 392, maps, illustrations. Price 12*s.*

The author's professional duties took him to Japan in 1851, 1863, and 1871, and his work lay almost entirely in parts never visited by Europeans. His last visit appears to have extended over a lengthened period; and his rambles in pursuit of game and natural history objects during the winter months' leisure, added to the opportunities for breaking new ground afforded by surveying work and the pursuit of piratical craft, have resulted in many notes descriptive of the little-known shore region of Yesso, the inland sea of Nipon, the interior of Kiusiu, and the Kii coast in Japan, and of the coasts of Korea and China.

Particular attention is devoted to the currents and typhoons, the habits and distribution of animals, and customs of the people; and the work is illustrated by various tinted views of localities, and woodcuts, a general map of the Japanese islands, and separate maps of the Inland Sea, Korea, and the coast of China from Swatow to the Tonquin Gulf.

AFRICA.

Jeppe, F.—Transvaal Book Almanac and Directory for 1881. Maritzburg (Davis): 1881, post 8vo., pp. 265. (*Silver & Co.:* price 5*s.*)

This third issue may be mentioned here, as it contains positions of the principal places in the Transvaal and its neighbourhood, fixed by Mohr, Baines, Mauch, and others, and also (pp. 179–184) various routes with measured or approximate distances, and distances of telegraph stations on the Natal extension, with other local matter likely to prove of interest at the present time.

AMERICA.

Dixie, Lady Florence.—Across Patagonia. London (Bentley): 1880, 8vo., pp. 251, illustrations. Price 15*s.*

The authoress accompanied her husband, her two brothers (Lord Queensberry and Lord James Douglas), and Mr. J. Beerbohm, starting in December 1878, and arriving at Sandy Point viâ Rio and Monte Video. The party travelled on horseback along the Straits of Magellan to Cabo Negro, visiting Laguna Blanca, and making various excursions into the Cordillera. The details are of personal adventures in hunting, &c., and the book is well illustrated from sketches by Mr. Beerbohm, engraved by Whymper and Pearson.

Selwyn, A. R. C.—Geological Survey of Canada. Report of Progress for 1878–79. Montreal (Dawson Brothers): 1880, 8vo., pp. 13, 239, 72, 26, & 25, maps, illustrations. (*Sampson Low & Co.*)

Without reference to the purely geological portions of this Report, it derives special value from containing a long and carefully elaborated account of the Queen Charlotte Islands, by Dr. G. M. Dawson, and another Report on Explorations of the Churchill and Nelson Rivers on the western side of Hudson's Bay, by Dr. Robert Bell, with a supplementary account of the surveys of Island and God's Lakes and the connecting waters to Oxford Lake, eastward of Winnipeg, by his assistant, Mr. A. S. Cochrane.

Mr. Selwyn records the main features of the field operations of the Survey during the then past year, which, extending from the east to the west of the dominion, and from Manitoba to Hudson's Bay, have assumed the character of a rapid reconnaissance of the physical and economic features of the country, more interesting to geographers than of practical geological importance. Most of this work has been carried on in connection with the Canadian Pacific Railway, and has been already published in a preliminary form by Mr. Sandford Fleming. It may here be noted that in some of the maps published with this Report, geological notes, signs, and lettering appear in red; and that it is proposed to extend this idea in future maps by using black for topography alone; red, green, and blue lettering being respectively reserved for geological, botanical, and zoological subjects.

Dr. Dawson's Report on the Queen Charlotte Islands (239 pages, 14 pls., 3 maps) is an important contribution to a knowledge of their geography. Commencing with an account of the position, discovery, and early history of the islands (extending over some 14 pages), a general description of them is given at considerable length, followed by geological observations. A comprehensive ethnological account of the Haida Indians, aborigines of the group, with a separate vocabulary of their language, meteorological observations and notes on latitudes and longitudes (by Dr. Dawson), a list with remarks on marine Invertebrata (by Mr. J. F. Whiteaves), notes on the Crustacea, including those of Vancouver Island (by Mr. S. I. Smith), and a list of plants (by Mr. J. Macoun), are given as appendices. The illustrations, in photo-lithography, give some of the prominent physical characteristics (of which the view of Pillar Rock, Graham Island, may be specially noticed), and some very interesting houses and carved posts of the Indians, with purely ethnological subjects.

The larger map (scale, 8 statute miles to the inch), from original running surveys as well as the Admiralty charts, coloured to represent the different formations, is executed with great clearness; another map (scale 2 nautical miles to the inch) gives the five principal harbours; and a third (scale 1¼ statute mile to the inch) gives minute geological particulars of Skidegate Inlet, with sections, from surveys by Richardson and Dawson. Various smaller maps and sections are given in the text.

Special attention is given to the tidal peculiarities which follow the broken and varied coast-line, the hot springs, bituminous exudations, distribution and density of timber, indications of copper and iron, and other points likely to prove of practical interest. The chief mineral feature appears to be the existence of a bed of true anthracite coal in the cretaceous rocks, and its development into a really workable condition would be of great economic value on the Pacific coast. The attempts as yet made have not succeeded, but from the examinations now recorded it appears that the indications of continuity and uniformity in the seams are sufficient to render a very careful and systematic survey desirable, though there is as yet no ground for the belief that the district is as important as the Vancouver coal-producing area. Details and a plan are given of the openings, &c., already existing.

Dr. Bell's Report on his explorations of the Churchill and Nelson rivers affords a good knowledge of the principal geographical features of the country. His track surveys amounted in the aggregate to 1655 miles, and during them observations were frequently taken for latitude and magnetic variation, and at a few points for longitude. The daily barometer and thermometer readings were registered, and temperatures of rivers and lakes taken, some fifty photographs also being secured, to illustrate the most interesting features of the regions explored. Broadly speaking, as far north as Sipi-Wesk Lake, on the Nelson River, and Knee Lake, on the boat route from Lake Winnipeg to Hudson's Bay, both soil and climate appear sufficiently good to maintain a population entirely dependent on agriculture.

The important question of the water-supply of the rapidly increasing city of Winnipeg is incidentally discussed in this part of the Report, in consequence of Dr. Bell having brought home samples of the water of the Assiniboine and Red rivers for analysis. Among other interesting points may be mentioned the instances of glacial striation accurately recorded, the precise northern limits of forest trees given, and the discussion of the plants, fossils, mollusks, insects, and birds given in the appendices, which also contain a list of the variations of the compass in twenty-one localities in the territory explored during the season.

Mr. Cochrane's explorations of the God's and Island lake country are illustrated by a map from his track surveys (scale 4 miles to the inch), and accurately define the physical peculiarities of this lacustrine region, with its soil variations and timber capabilities.

[**Wright, Major-General H. G.**]—Annual Report of the Chief of Engineers to the Secretary of War for the year 1879. In three parts. Washington (Government Printing Office): 1879. Pt. I. pp. 1–950, Pt. II. pp. 951–1890. Pt. III. pp. 1891–2399. Maps, tables, illustrations.

Although dated 1879, this voluminous Report (46th Congress, 2nd Session, Ex. Doc. I., pt. 2, Vol. II.) has only just come to hand from the Engineer Department of the U.S. Army. Apart from the portions of it exclusively referring to works of a purely military engineering nature, and to the improvements of harbours, rivers, &c., the operations of the surveys of the northern and north-western lakes and of the Mississippi under Major Comstock, the exploration of the 40th parallel (now completed) under Mr. Clarence King, and of the geographical surveys of the U.S. territory west of the 100th meridian under Captain Wheeler, with some minor reconnaissances and explorations, are here given.

The surveys of rivers, harbours, &c., are illustrated by charts giving much minute local topography, and in some cases (such as Captain Howell's Report on certain bays and passes in the peculiarly formed coast of Texas on the Gulf of Mexico) are of more than professional interest. Illustrations of the complicated hydrography of the bayous of Louisiana, accounts of the examination of the Big Sunflower, Coldwater, and Tallahatchie rivers, which with the Yazoo will form the main commercial avenues of an undeveloped country of the greatest fertility in Mississippi, and descriptions of little-known rivers in Arkansas, are to be found in Major Benyaurd's Report; while the natural obstructions to navigation in various parts of the courses of the Mississippi and Missouri are discussed and illustrated in those of General Humphreys, Colonel Simpson, and Major Suter, the latter with detailed maps of portions of the Missouri. Lieutenant Maguire deals with that river above the mouth of the Yellowstone, of which river also he gives a short account, with distances and rates of fall. Many parts of the Upper Mississippi are in like manner elaborated by Major Farquhar; but the most important contribution is perhaps Major Comstock's Survey of the Northern and North-western Lakes and the Mississippi, which is illustrated by charts showing the progress of the respective triangulations, and by tables of water-level curves on Ontario, Erie, Michigan, Huron, and Superior.

Captain Wheeler reports the acquisition of considerable material for the resulting topographical map, with geological and zoological matter, by the forty-six observers forming his parties in various States and Territories west of the 100th meridian. A list of 756 altitudes, many tables of distances, mining notes from various districts (with outline map of the Washoe district, Nevada, showing the Comstock Lode), and details of the operations of the various parties are given, the latter with occasional maps. The whole of this section is illustrated by a coloured map (scale nearly 95 miles to the inch) showing the progress of the surveys west of the 100th meridian, on which the stations, different lines, and areas of other surveys are separately indicated by colours. Special astronomical, geological, and ornithological appendices are given.

Explorations and surveys by Captain Stanton in the Department of the Platte (accompanied by meteorological observations at Fort Laramie, Wyoming, with tables of barometric horary curve and mean thermometric differences); a Report by Lieutenant Ruffner, with map showing military roads to Fort Lewis, Pagosa Springs, Colorado, with description of the springs and a chemical analysis of their waters; reconnaissances in New Mexico under Lieutenant Stedman, in Dakota by Lieutenants Maguire and Hoffman, and at Fort Keogh, Montana, by Mr. Durage, and an account of the mammals and birds of the Big Horn river and mountains of Montana by Mr. C. E. McChesney, complete this elaborate Report, to which reference is facilitated by a general index repeated at the end of each part.

ARCTIC.

Hellwald, F. von.—Au Pôle Nord. Voyages au pays des glaces. Paris (Ebhardt): 1881, 8vo., pls. (*Williams & Norgate.*)

The first part (price 4*s.* 6*d.*) of a French translation by C. Baye, of Hellwald's 'Im ewigen Eis,' noticed in our February number, containing 240 pages, and circumpolar map from Stieler's Atlas, and many illustrations.

GENERAL.

Supan, Alexander.—Statistik der unteren Luftströmungen. Leipzig (Duncker & Humblot): 1881, 8vo., pp. 296, 3 maps. (*Dulau:* price 8*s.*)

The author, Professor of Geography at the University of Czernowitz, has collected and given in a geographically arranged form, the results of statistics of the lower wind-currents of the world, with special reference to the climatology of each country. A copious index of the stations quoted, with their positions and elevations, is given; and the work is illustrated by original summer and winter wind-charts of the northern hemisphere and of Europe.

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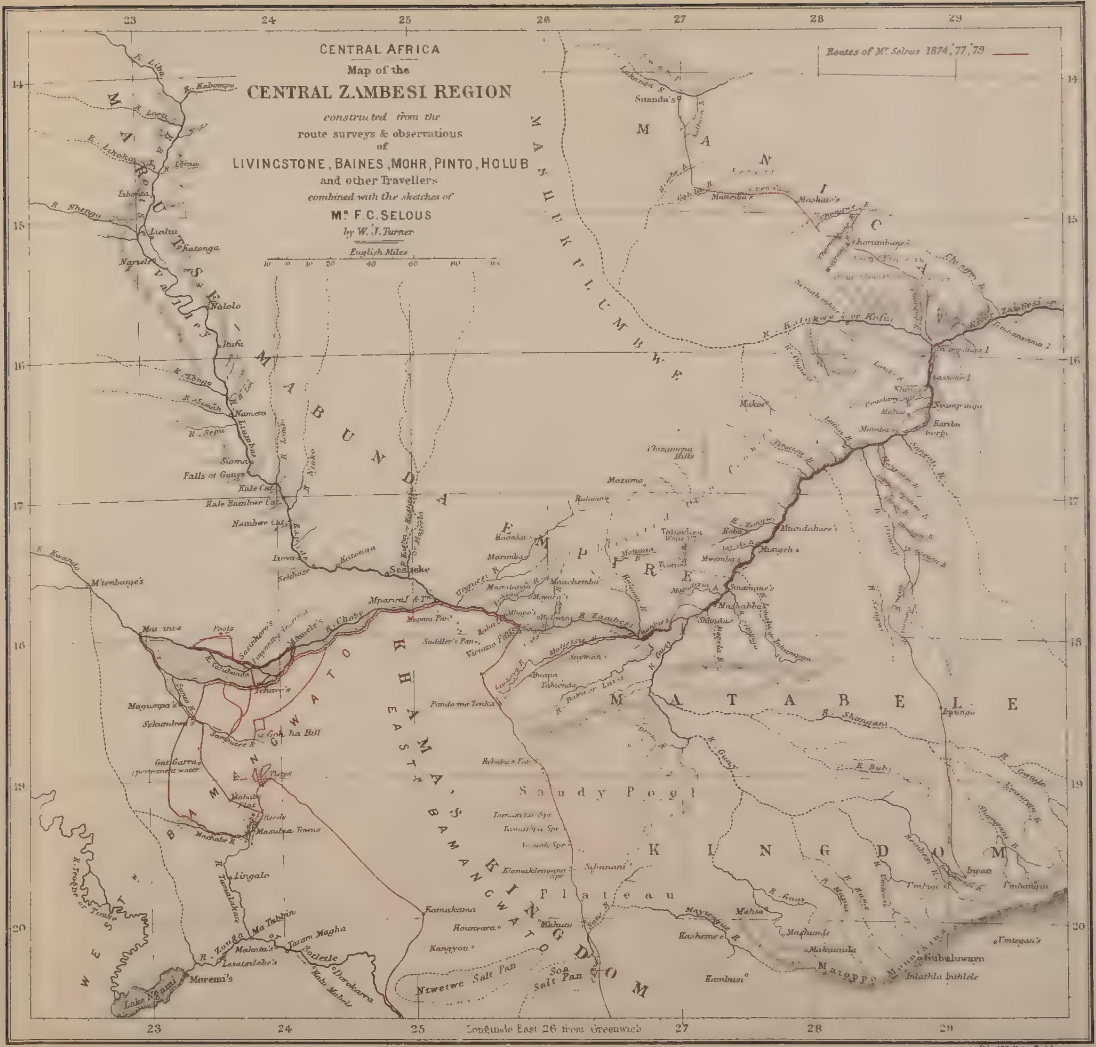

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Edwd. Weller, Red Lion Square

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Notes on Saràwak and Northern Borneo.

By William M. Crocker, Resident of Saràwak.

(Read at the Evening Meeting, February 14th, 1881.)

Map, p. 256.

I have much pleasure in presenting the Society with the result of my geographical gleanings during a residence of sixteen years in Saràwak, and in reading a few notes on the physical and political aspects of the country. I have been able to obtain some data concerning the sources of the principal rivers and the general configuration of the country; and, in the absence of more complete and accurate surveys, I trust my sketch-map may throw some light on a portion of the globe which, up to the present time, has remained almost a blank space on the map of the world.

Taking the Admiralty charts for my coast-line, the map is compiled partly from actual observations, and partly from the surveys of others.

For the Saràwak river and the upper district I am indebted to Mr. Helms, formerly of the Borneo Company; for the Sadong to Mr. Wallace. The Batang Lupar and Saribas are taken from Admiral Keppel's 'Voyage of the *Dido*,' the upper country having been since explored by Mr. Everett. For the notes on the Upper Rejang I am indebted to Dr. Beccari.

The delta of the Rejang, the Pelobahan and Egan, and all the rivers to the eastward of Sirik, up to the Barram, were navigated by me in a small steamer. I kept an exact itinerary of the courses by compass, and the distance travelled I measured by time. I endeavoured to be careful in my observations, but I do not claim immunity from errors, more especially as I could not determine the longitude of my positions in the interior. The heads of rivers were filled in after careful inquiries from various natives, and by comparing notes with the out-station officers, who have lived for years on the different rivers. The courses of the Barram and the Limbang are taken from Mr. Spenser St. John's 'Life in the Forests of the Far East.' All the surveys of others I have reduced to the scale of my own observations.

A glance at the map will show that there are eleven principal rivers in the Saràwak territory.

Beginning at Tanjong Datu, the western boundary, and travelling to the eastward, the first river will be seen to be the Lundu; but this river is not of much importance, partly on account of the bar at the mouth, which gives three feet only at low water, and partly because it is so sparsely inhabited. The town or principal village is situated about 10 miles up the river. A small fort stands on the left bank, and a pretty little church on the right. The river is peopled by Land Dyaks and Chinese, and the principal articles of export are rice and bilian timber (ironwood). The bay between Tanjong Datu and Lundu is famous for turtle, which resort to the islands of Talang and Satang during the fine monsoon, from May to October: there is a government prohibition against killing them, and the collection of their eggs is farmed. Shoals of trobok-fish also frequent this bay; they are caught in large quantities, and their roes exported to China, where they are considered a delicacy.

The country lying between Tanjong Datu and Lundu is mountainous, in some parts rising close from the sea-shore. The magnificent mountains of Brooke and Poe, the latter over 6000 feet, rise directly from the banks of the Lundu. All this part of the country is still covered with primeval forest, and possesses good soil: capital and labour are all that is required to make this the most important as it is the most picturesque part of the Saràwak territory. Plantations of gambier and pepper have lately been opened up in Lundu, and promise well.

The lowland skirting the sea lying at the foot of the Matang and Sampadi mountains, between the Lundu and Saràwak rivers, is so intersected with streams that it is not an uncommon occurrence for even natives to lose their way, and for Chinese to die of starvation after fruitless efforts to find their way out.

The Saràwak river has two entrances, both of which are very picturesque, owing to the bold nature of the coast-line. The Moratabas, being both the deeper and safer, is generally used. It will ever be regretted that the town of Kuching, the capital of Saràwak, was not built on the undulating country near the Moratabas entrance, instead of 18 miles up the river. It is now almost impossible to remove the town, as during the last twelve years a substantial brick bazaar has been completed, besides other expensive public buildings and private residences. A new fort has just been finished, and a market and hospital are in the course of erection. Good roads are kept up by the government, and all surplus revenue is devoted to improvements. The town of Kuching has a population of about 12,000 inhabitants, and is rapidly growing, and the trade steadily increasing.

The river is somewhat difficult of navigation, but many ships of war of considerable size have anchored off the town. A trading steamer keeps up bi-monthly communication with Singapore, and there are nearly one hundred square-rigged vessels and native schooners sailing out of the port, chiefly engaged in carrying sago and produce from the coast.

The upper country is rich in minerals; gold is worked by the Chinese, and diamonds by the Malays. All other minerals are leased to the Borneo Company, who export antimony and quicksilver in considerable quantities, as the following extract from the trade returns will show:—"Antimony exported from 1859 to 1879, 25,000 tons, value more than one million dollars. Quicksilver exported from 1870 to 1879, 15,000 flasks, value 717,500 dollars." Gambier and pepper are being cultivated with great success, and there is every prospect of a large influx of Chinese capitalists and coolies. Experiments have also been made from time to time in cultivating coffee, sugar, and tapioca, but hitherto these experiments have ended in financial failures.

The Samàrahan river has a bar at the mouth, but it is fortunately connected with the Saràwak by a stream sufficiently large to admit of all produce being brought to the capital without the necessity of going out to sea. This district is inhabited by Malays and Land Dyaks, who plant rice and sago.

The next river is the Sadong, which rises in the high mountains that form the boundary between the Dutch and Saràwak territories. After rushing over a rocky bed for about 30 miles, it continues a rapid stream for nearly 30 miles more, when it flows through about 40 miles of flat country before it reaches the sea. It is navigable for vessels of large size, notwithstanding there is a long shallow entrance, giving only seven feet at dead low water. The bar is composed of soft mud, and there are no dangers in the river, which deepens to six fathoms inside. There is a bore in this river at full and change of the moon, but it is not of sufficient violence to interfere with navigation. The upper country is peopled by about 6000 Land Dyaks, a simple people, devoted to the culture of rice. The principal Malay village is situate on the Simunjan branch, about 18 miles from the mouth. A block-house is here erected, and a short distance up the Simunjan stream is a coal-mine, at present worked by the government, which yields a coal of very good quality.

The Sadong river forms the boundary of Saràwak Proper, now styled the First Division of the Territory of Saràwak. It has a population of about 30,000 souls, composed of Chinese and Malays on the coast, and Land Dyaks in the interior. The Land Dyaks were formerly harassed and oppressed by the Sea Dyaks; their heads went to adorn the houses of their more powerful neighbours, and their children were carried away into captivity and slavery. This oppression has been removed, but their progress towards civilisation is not as satisfactory as could be desired, more especially when it is known that they are a very tractable people, who might easily be induced to adopt the habits of civilised life, and who would readily accept any improvement in agriculture introduced amongst them. They have been left to themselves, and the consequence is, they farm in the most primitive way, merely scratching the ground, and scarcely producing rice enough for their own consumption.

The first river in the Second Division is the Batang Lupar. Reference to the map will show this to be a river of considerable size. There is a bar at the mouth, giving 3½ fathoms at high water and 10 feet at low water, and the river is navigable for large vessels as far as Lingga, about 30 miles from the mouth. Just above this point the bore begins. A single wave rises to the height of about six feet above the level surface of the river, and rolls up for some 60 miles, with a roaring noise and foaming head, at a rate of several miles an hour, oversetting all it meets. This bore begins about three days before full and change, and lasts about three days after. The rise and fall of the tide is so great, and the river so full of shallows, that navigation beyond Lingga is always more or less dangerous. A government fort is placed at Simanggang, about 80 miles from the mouth, where there is a large Malay town. The upper country is peopled by some of the most warlike tribes of Sea Dyaks; a small Chinese settlement has been made at Marup. Many years ago, when His Highness the Rajah was Resident of this district, he encouraged some Kay Chinese to try the gold-field at Marup, and, to secure its development, he at first gave them government support. Since that time an extensive gold-field has been *proved*, and for many miles an alluvial deposit is found, yielding gold in paying quantities, and sometimes in pockets speedily enriching the workers.

I visited Marup some months ago. After about a hundred miles' trip up the river, and a walk of three hours inland, I came suddenly on the settlement. It was a novel sensation, finding a peaceful Chinese village in the very heart of the turbulent and head-taking Dyak country, quite a hundred miles beyond the confines of civilisation. Through the village there ran a stream of deliciously cool water, flowing over a bed of rocky boulders; immediately behind this rose high and fantastic-shaped hills, the whole forming a most interesting scene. Here these people have lived for many years, all the time on excellent terms with their Dyak neighbours; many of them had never left the spot, some had retired to China, whilst others had found a resting-place in this quiet valley, as many a cairn of stones betokened.

The principal exports from the Batang Lupar are gold, rice, rattans, and guttapercha. An extensive coal-field has been proved at Silantek, up the Lingga river. Competent engineers report unlimited quantities of excellent coal, the only drawback to its development being the capital required to make an 18-mile railway, which is necessary to bring the coal to Lingga, a point in the Batang Lupar where a thousand-ton ship could load with safety.

The Saribas and Kalukah rivers are of less importance; they are both peopled by Sea Dyaks and Malays, the total population of the district being about 45,000 souls.

The Rejang is by far the most important river in the Saràwak territory. Its numerous tributaries rise in the very heart of Borneo, and after a rapid descent in the course of a hundred miles, in which there are numerous almost impassable rapids, it becomes a navigable river at the bifurcation of Balleh, where a fort formerly stood, but which has now been moved a few miles down the river. From this point to Kanowit it passes through an undulating country until it reaches Sibu Island, when it branches off and forms a delta, the two main streams emptying themselves into the sea about 60 miles apart. A glance at the map will show that there are numerous other diverging branches which cut up the delta into a great number of deltic islands. The whole of this part of the country is perfectly flat, and is doubtless formed by alluvial deposits.

A government fort is placed on the island of Sibu, and a large Malay town is built in its vicinity. The country below this is very sparsely inhabited, but the upper waters are peopled by numerous tribes, the principal being Sea Dyaks, Kyans and Pengs, numbering over 60,000 souls. It is most interesting to study the gradation of civilisation to be found in this river, from the semi-civilised Sea Dyaks in the low countries to the tribes of the far interior, who neither cultivate the ground nor live in huts, but who roam the forests in search of game and fruits, living in an absolute state of nature.

Rice is the staple article of food on the Rejang, but here again the system of agriculture is so primitive and defective that the people do not grow enough for their own consumption. Guttapercha and rattans are exported from the district in large quantities. Bilian timber (ironwood) has been an article of export to China for many years. This trade is increasing, and there are three companies now engaged in the trade, whose headquarters are at Rejang village, which has become the shipping-port where ships of the largest size can load with safety.

The Egan branch of this river forms the boundary of the Second Division.

The Third Division is formed by the rivers Bintulu, Tatau, Balinean, Mukah, and Oya. These rivers, as well as the delta of the Rejang, have been filled in from my own observations. Nearly all of them rise from one mountain range, the highest peak being named Ulat Bolo. The country from the coast to this range is very flat, and were it not for the valuable trade of the district, the rivers themselves would not be of much importance.

The sandy beach along the coast is fringed with casuarinas, which stand like a black wall against the horizon. There being no sign of high land, nothing presents itself to the eye but a low unbroken line of jungle. All the rivers on this coast have a bar at the mouth, giving about nine feet at the top of high water; they are, however, easily navigated by small coasting schooners during the fine monsoon, from April to November. During the north-east monsoon a heavy sea prevails, when the Malays lay up their schooners in Kuching, and all trade is at a standstill.

Kidurong Bay, the northernmost boundary of Saràwak, possesses the only well-sheltered harbour along the whole coast from Tanjong Sirik to Labuan. The anchorage in Kidurong is good, being soft mud and sand, but it would only be available for small vessels, the soundings being not deeper than 2½ to 3 fathoms. Vessels could ride at anchor, sheltered from E.N.E. and N.W. gales.

There are government residents stationed at Oya, Mukah, and Bintulu. The forts are all built near the largest towns, at the mouths of the rivers. The inhabitants live within a few miles from the sea, and number about 20,000 souls; they are called Milanows. Their staple article of food and the principal article of export is sago. The sago palm flourishes on the marshy banks of the rivers all along this coast to about 20 miles inland; the export last year of raw sago amounted to more than 20,000 tons.

The sago palm is found on the coasts of Sumatra, Celebes, New Guinea, and the Moluccas, but will not flourish outside this limit. Borneo must, however, be looked upon as the home of this palm, as the territory of Saràwak alone furnishes more than half the sago produce of the world.

Having lived for some time amongst the Milanows, and little being yet known about them, the information I have collected of their strange customs may be interesting. They come from the same stock as the tribes of the interior, who are still living in the rudest form in which we can conceive human beings to exist; but they, being early visited by the Malays for the purposes of trade, have adopted the Malay dress, and many of them the Mahommedan religion. They are well housed, their women dress in silks and wear gold ornaments of considerable value; English glass, crockery, and cutlery are to be found in their houses, and they are in fact comparatively rich.

In every river along this part of the coast, some of them only four miles apart, we find a different dialect. Fear of the Saribas and Illanun pirates, who were constantly on the look-out for plunder in this locality, fully accounts for the little communication that existed between them before Sir James Brooke appeared on the scene. Their houses were formerly built on posts of hard wood, raised about 40 feet from the ground, for protection against their enemies. Several of these houses still stand, but they are never replaced or rebuilt now, as, under Saràwak rule, peace and order have been restored, and the people can follow their daily avocations without fear of pirates at sea or head-taking Dyaks ashore, and now the inhabitants from all the rivers, from Rejang to Bintulu, can converse with each other.

In personal appearance the Milanows strongly resemble the other tribes inhabiting the Saràwak territory, and can only be distinguished from them by the squareness of their features; the women, however, have unaccountably won a reputation for beauty. It is true there are some good-looking girls amongst them, but as a tribe they are far behind the Malays in figure and regularity of features; they are very white (that is, an unhealthy milky white), but having to work all their lives treading or expressing the sago from the pith of the palm, their feet become large and their figures squat and stumpy. Their heads are flattened by means of pressure in infancy, but not to the extent of disfigurement. I believe the practice of flattening the heads of children is confined to the Milanows; I have not heard of its having been found to exist amongst any of the numerous tribes which inhabit the Eastern Archipelago. A similar custom prevails amongst the Indians of the Musquito shore in Central America.

The men are about the middle height; they are not tattooed, nor do they use any ornaments or personal decorations. They are mild and peaceable, being quiet and gentle in disposition; they care not for heads, although a few are still kept in their houses. They are submissive to the authority of their superiors, and crime is of rare occurrence amongst them; the most serious cases with which the European Residents are troubled are "becharas," or suits connected with their sago lands. Several of them have shown a great aptitude for learning, and have even learnt to write the English character. It is to be hoped the government will soon establish schools amongst them, and that the mission will send some of the missionaries from the Land Dyaks, who seem averse to their teaching.

Polygamy exists amongst the Milanows, but they rarely marry more than one wife; and their domestic affairs being so arranged that the work is equally divided amongst all the members of the family, they are happy and contented.

The Milanows, like the Dyaks, live in gross superstition; they believe in dreams and omens, and regulate their journeys by the flight of birds. Their religion—if a belief in good and evil spirits can be called a religion—is, curiously, the same as that found amongst the

Cochin Chinese.* They believe that the regions above are similar to the terrestrial world; that mountains, valleys, streams, and lakes are found there as here, and governed by various spirits. They believe in a supreme God, who possesses power over all the spirits, whose name is "Epoo." His habitation they cannot define, but he reigns supreme in the unseen world. They have several malignant spirits of the river, sea, lightning, &c., but only one good spirit, named "Balu Adad," described as a beautiful female: all souls are given into her care at the feasts of the dead, and she conducts them to the other world.

When a man of property dies, sago trees are cut down, with the belief that they will be found ready-grown for the owner's use in the other world. An elaborately got up prahu, or small ship, is carved out of the sago palm and decorated with flags; this is placed near the grave, and is to be reproduced in the next world in the shape of a large schooner, anchored off the departed spirit's abode, ready for use. Arms, sirih box, brass guns (the current money of the Milanows), and clothes are placed in the coffin for use in the next world; the coffin is then interred for three days, during which time the deceased is supposed to be preparing for his journey. "Balu Adad," the beautiful female, now takes possession of the spirit, and conducts it to the Elysian Fields. But the troubles of the deceased are not over yet, as in the middle of the narrow road which leads to Paradise is stationed a huge and ferocious dog, named "Maweang," and woe be to him who is not provided with a small bead, named "telak," to appease this monster. For this purpose a bead of the proper description is always placed on the right arm of the dead.

When a chief dies, the body is allowed to decay, and the remains are placed in a jar, which is deposited in a large tree or post, hollowed out for the purpose. These mausoleums are usually made of bilian, or ironwood; they are sometimes of immense size and elaborately carved, and, as the wood is almost imperishable, graves or monuments are still extant which can be traced back for generations.

The pangeran (Malay title for prince), from whom I collected most of my information, told me that his grandfather was buried in this way, and that a slave was chained to the post and starved to death, in order that he might be ready to follow and serve his master in the other world.

On making inquiries about rewards and punishments, I was informed that the same dispositions and passions which govern mankind here will govern them there; the evil-disposed will continue to be evil-disposed. Death enters the other world, and the spirit finally assumes the form of a grub or caterpillar.

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* May not this be another link in proof of Mr. Wallace's theory, that Borneo was formerly attached to the mainland of Asia, or, at all events, of the theory that Borneo was originally peopled from the North?

A few months after the death of a Milanow the friends assemble for a monster cock-fighting and feasting, which lasts three or four days; sometimes as many as three or four hundred cocks are killed, the sacrifice being for the benefit of the departed spirit.

The Milanows owe their improved condition to the presence of the sago palm. The trade in sago is steadily advancing, and as the commercial price of this article has increased fifty per cent. in the last ten years, the Malays in other parts of the territory are waking to the value of the palm, and making extensive plantations, which in a few years will considerably increase the importance of this export.

It will be seen from my remarks that the principal exports from the Saràwak territory are, from the First Division, antimony and quicksilver; from the Second Division, guttapercha and jungle produce; and from the Third Division, sago. Gambier and pepper may now be added to the list, and, to show the prosperity of the country, I have only to mention that in 1854 the revenue amounted to 26,000 dollars, and that it has now reached 250,000 dollars, showing an increase of 900 per cent. The trade in 1854 amounted to 671,000 dollars, and has now reached 4,000,000 dollars, showing an increase of 600 per cent. in twenty-six years, and both trade and revenue are steadily increasing.

The climate of Saràwak is very healthy for Europeans. The rainfall ranges from 160 to 200 inches a year, but, in spite of this humidity, it is salubrious. The usual daily temperature ranges from about 72° in the morning to 88° at midday; it rarely rises over 90°, or falls below 69°.

In addition to my map of the north-west coast, I have added a small sketch-map of Borneo, showing the general configuration of the country. Nearly all the large rivers have their sources in the centre of the island, where, according to native report, there is a very high mountain, named by some "Tibang," by others "Tidong," from which rise the Bulongan and Kutei, flowing to the eastward, and perhaps the *Kina Batangan*, a splendid river which flows through the country ceded to the North Borneo Company, and which empties itself into a bay on the north-east coast; the Barito, or Banjer Massin, flowing to the southward, and the Kapuas and Rejang flowing to the westward. Nearly all maps of Borneo show a continuous chain of mountains running from north-east to south-west; but this in reality has several breaks. The highest known mountain in Borneo is Kina Balu, in the North Borneo Company's territory, which, according to Admiralty surveys, has an altitude of 13,698 feet; probably Tidong, in the interior, is the next highest, and there are several ranging from 6000 to 8000 feet above the sea.

The chain of mountains is continuous from Tanjong Datu to Simingit, longitude 113°. On a journey I lately made to Lake Seriang, in His Netherlands Majesty's territory, I passed through a perfectly flat country, although away to the north-east could be seen high mountains, which the natives call the One Thousand One Hundred Hills. These mountains seemed to stretch away to the north-east, and doubtless the general watershed of the country is formed by the line running in the direction indicated on the map.

There are several lakes in Borneo; the largest is supposed to be Lake Kina Balu, which in all existing maps of Borneo is marked as lying to the southward of the Kina Balu mountain, in the newly acquired territory of the North Borneo Company.

Mr. J. Hunt, who communicated an account of Borneo, in 1812, to Sir Stamford Raffles, reported the existence of this lake, and stated that it was the source of many of the great rivers of Borneo, and was five or six fathoms deep in some parts, interspersed with small islands, the water being of a whitish hue, but perfectly salubrious.

But I do not believe that any such lake exists, nor am I alone in this opinion. Mr. Spenser St. John, who ascended Kina Balu, and who had a good view over the country lying to the south and south-east, says that it certainly does not lie in that direction, where he says there is a large plain. But a man who accompanied Mr. St. John said that he had traded with the villages on the banks of the lake, and asserted that, standing on the beach, he could not see the other side.

Mr. St. John must have lived long enough in Borneo to know the value of native reports. Not long since, I passed the night in a Dyak house in the Sadong district, where I met an old man who informed me that he was a Malow—one of a tribe living on the upper waters of the Kapuas. He assured me in the most solemn manner that he had seen men with tails; he said he ascended the Kapuas to near its source, and then walked across to the head of the Banjer, which rises near a very high mountain named "Batu Bulan" (moon stone). Here he fell in with a tribe of men with tails. He could not speak their language, but he and his friend managed to make themselves understood, and were treated very kindly by them. They remained seven days and nights amongst the tribe. Both men and women had tails. They wore bark of trees as a covering, through which a hole was made for the tail to pass through; they planted paddy, and lived in long houses. These and other particulars he recounted, which gave a colouring of truth to his statements. I have heard these stories continually from other sources, but I am convinced these wonders are all invented by Dyaks and travellers, who have returned from long journeys into the interior, for the purpose of magnifying their own importance.

From personal experience of lakes in Borneo, I am inclined to think that the numerous rivers which no doubt descend the Kina Balu mountain in the rainy season would naturally overflow the plain mentioned by Mr. St. John as lying to the southward, and that the district thus inundated, having been visited by native travellers, has been mistaken for a lake. I have visited two lakes in Borneo;

one marked in the map as lying at the head of the Simunjan river, in the Sadong district. I found the lake surrounded by an amphitheatre of hills, which accounted for the accumulation of water in the rainy season, the place being quite dry in the fine monsoon.

I have very recently visited Lake Seriang, in Dutch territory. After a four days' journey up the Batang Lupar, in a canoe manned by fifty men, Mr. Maxwell, the Resident of the district, myself, and party reached Lobok Antu Fort, walked to Nanga Badow, where the Dutch are building a small military station, and on the following day started at 6 A.M., and after a three hours' walk reached a small stream named the Pesaya, down which we pulled for about four hours before we reached the lake. During the last hour of our pull we found the whole neighbourhood under water, and passed through a desolate-looking country, there being nothing but a little brushwood above high-water mark, and the blackened and charred remains of what were once fine jungle trees.

This lake has been described as 25 miles long and 9 miles wide, and we found it a fine sheet of water, with four gunboats anchored off an island. Nevertheless, I was told that in 1877, after a drought, it quite dried up; in fact, the remains of a settlement, since abandoned, were pointed out to us on Majang Island, which was attacked by Dyaks, who took advantage of the drought to approach by land. The Dyaks were driven off, but they fired the jungle in their retreat, destroying the forest for miles around.

The following extract is taken from my Diary, written on Lake Seriang, Friday, February 27th, 1880:—

"A heavy squall during the night had cleared the air. I came on deck to find it delightfully cool, and the view over the lake very pretty. To the westward lie the nearest mountains, the highest being about 2000 feet. The lake in the wet season stretches away to the foot of the nearest of these hills, although there is now about two miles of jungle intervening. On all sides, at a considerable distance, mountains can be seen on a clear day, the several streams from which empty themselves into the lake. The only high land is a small island on which once stood a settlement. It is of no great extent, being at present only a few feet above high-water mark. A Malay told me yesterday that the last time he visited the lake the whole country was inundated. On that occasion he saw a Malay boy eating sugar-cane, and on asking where he got it, as he saw nothing but water, the boy told him he had dived down to their garden, which was on the island, and at that time several feet under water. Our boys amuse themselves fishing, and seem delighted at their success; the lake is literally swarming with fish, and in the dry season, when the waters abate, they are caught by the Malays in immense quantities, their roes only being preserved for the Pontianàk market."

I have given these extracts to show how lakes in Borneo are affected by the seasons.*

The centre of Borneo is still an unknown land, and offers a good field for an explorer. It would not be a difficult journey to go from the Bintulu, in Saràwak territory, into the Rejang, up which the traveller would have to proceed for some distance, and then, by an eight or ten days' journey overland, reach the head of the Banjer, down which he could proceed, thus crossing Borneo from north to south. Another good and probably easier route would be to cross from west to east, by ascending the Rejang, in Saràwak territory, and going down either the Bulongan, Kutei, or Kina Batangan. It would be necessary to take a party of friendly Dyaks from Saràwak, when such a trip could be organised and the journey performed without much difficulty or danger.

A small government steamer runs about 200 miles up the Rejang river, which might be an inducement for this route to be selected. I should advise going up the Rejang and down the Kina Batangan (a river quite unexplored), more especially as a Danish traveller, Mr. Carl Bock, has just succeeded in going up the Kutei and down the Banjer Massin.

In conclusion, I would call attention to the prosperity of the little state of Saràwak. Consul-General Ussher wrote as follows in 1877, after paying us a visit:—

"It is not every government that, on a yearly revenue of 40,000*l.* sterling, would be enabled effectively to rule 25,000 square miles of territory, with a population of 240,000 souls, to keep up a respectable standing military force, to garrison and maintain fourteen forts, to pay a competent staff of European officers and native authorities, to maintain three gunboats, to protect commerce and agriculture, and generally to guarantee safety to life and property within its limits. In the mean time the people appear to be generally contented and happy, and although there are defects to be found in the rule of Saràwak, they are such as require time to amend. Saràwak is not yet forty years old. Its power is based upon the remembrance of, and gratitude due to the late Rajah Sir James Brooke, as well as upon the firm administration and even-handed justice of the present government."

I do not say there are not defects in the Saràwak rule, I do not say the Dyaks are advancing in civilisation as fast as might be wished, I do not say that the figures I have given of the revenue and trade are much in themselves; but I do say that Sir James Brooke's scheme of developing a native country by native means, guided by English intelligence, is an undoubted success; and in spite of Sir James Brooke's fears that she could not stand alone, Saràwak has, quite alone and unaided, achieved and maintained an independence of which she may well be proud.

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* Since this paper was read, I have heard that my theory about Lake Kina Balu has been confirmed by Mr. Pryer, a gentleman in the service of the North Borneo Company, who has explored the country to the south of Kina Balu mountain, and in his report sent home states that no lake is to be found at or near the position marked in all maps of Borneo.

It is much to be regretted that whilst Saràwak has thus advanced, whilst the people under her rule are contented and happy, the subjects of the adjacent state of Brunei are still groaning under misrule and oppression. Of this I could adduce overwhelming evidence, showing how the wretched inhabitants are ground down by the exactions of petty princes. I understand the country ceded to the North Borneo Company is being opened up by following out the policy of Sir James Brooke, i. e. to rule the natives through and by their chiefs, respecting their religion, customs, and laws; to encourage amongst them habits of thrift and industry, and gradually to introduce progress and civilisation with peace and good order.

At the present time, the only British settlement in Borneo is the island of Labuan, which lies immediately off the entrance of the Brunei river. Every one acquainted with the history of Labuan knows it has not progressed, nor has the settlement produced the good results which were once anticipated.

A glance at a map will show how important it is to England that, with our present possessions in the Straits of Malacca and China, and the importance of our commercial relations in the Far East, we should still further strengthen our position in those seas. This position North and North-west Borneo afford. The splendid harbours on these coasts, in which the combined fleets of the world could ride in safety, and the unlimited supply of coal, secure a commanding position in the event of a naval war. Already the Russians possess strongly fortified settlements on the Manchurian coast to the north of China, and are said to covet the commodious havens of the Korea, where their daily increasing fleets might find protection. It is therefore manifestly of paramount importance to British interests and trade that England should maintain her supremacy in those waters by securing those advantages in Borneo which are now within her grasp, and which can be acquired with such evident benefit to the nation.

In introducing the author of the paper,

The President said he had the pleasure of introducing to the Meeting Mr. Crocker who was about to read a paper on the geographical and political aspects of Saràwak and North Borneo. Mr. Crocker had peculiar advantages for doing this, inasmuch as he had spent no less than sixteen years of his life at Saràwak, and had taken an active interest in all its affairs. During a large part of the time he had officiated as Resident, and during the absence of Rajah Brooke he had administered the affairs as President of the Administrative Committee. Throughout the whole period he had taken an intelligent interest in the interior of Borneo, an island second only in size to Australia, and which contained, probably, nearly as much unknown land as any other portion of the globe of equal dimensions. What the future of Borneo and the islands surrounding it would be was, of course, hidden in obscurity, but probably the paper would throw some light on this question.

At the conclusion of the paper,

Mr. **Alfred Dent**, on being invited by the President to speak, said he was afraid he could give but very little geographical information with regard to North Borneo, as he only visited there for three months. During the past eighteen years very little had been written about the island. Mr. Spenser St. John, who spent many years in Saràwak and Labuan, published in 1862 his book on the 'Forests of the Far East,' in which he gave a better account of North Borneo than could be found anywhere else. Mr. Wallace's works date from his visit to these parts about the same time. Previously books had appeared by Admiral Keppel, Sir Rodney Mundy, and Sir Edward Belcher. The earliest information of any value obtainable with regard to North Borneo seemed to be contained in a pamphlet written in 1769 by Mr. Alexander Dalrymple, who was well known in those days. He took a very great fancy to North Borneo. He was in the employ of the East India Company, and in 1763 obtained for them a cession of the whole of North Borneo, as detailed in a plan that he put before the Company for extending the commerce of England in that direction. The cession included all the territory from the Kimanis river on the west coast (about 5° 20′ N.) to south of Cape Kaniongan on the east coast (about 1° N.). The East India Company paid but little attention to their new acquisition, whilst the Dutch have since advanced their boundary a good deal further north than Cape Kaniongan. The territory that the Sultans of Brunei and Sulu have lately ceded to the North Borneo Company extends from the Kimanis on the west as far as the Sibuco river on the east coast (about 4° 20′ N.). Mr. Crocker had referred to the scarcity of harbours in Saràwak; North Borneo had the advantage of exceptionally good harbours, such as Ambong, Abai, and Gaya, the last being one of the finest harbours it was possible to imagine, capable of holding all the fleets of the world, and perfectly sheltered from both monsoons. Marudu Bay, on the north, was also well sheltered, and a great deal of trade went on in the neighbourhood. On the east coast, among the most important harbours was that of Sandakan, which was evidently regarded as of great value many years ago, there being an Admiralty chart of it dated 1774. Thirteen rivers flow into Sandakan Bay, one of them being a branch of the great Kina Batangan, the mouth of which was only discovered a few months ago. Whether these great rivers, the Sibuco and the Kina Batangan, run north or south was still quite a mystery. The country therefore offered a grand field for geographical exploration. Mr. Pryer, who was at present the Company's Resident at Sandakan, and was very fond of travelling, had made several excursions into the interior; but he was not a practical surveyor, and therefore did not lay down the course of rivers, &c., in the way that could be desired. Mr. Witti, who resided on the west coast, had explored all the country from Gaya Bay round Marudu Bay to the Kina Balu, and had sent home very interesting reports of his travels. The success of Saràwak encouraged the Company with which he (Mr. Dent) was associated to undertake an enterprise which would, no doubt, in these days be regarded as rather extraordinary; it was indeed the foundation of a new colony, for which North Borneo appeared to offer all the elements of success; he had friends associated with him, and felt confident that British energy and capital would not be wanting to carry out an enterprise with so promising a future before it. The present population was about 100,000; but the Malays would not work for wages, and the Chinese must be looked to as the chief helpers in opening up the country.

Mr. W. **Lockhart** said, though he had never been in Borneo, he had been much interested in the country when he was in China and the islands of the Indian Ocean. At Java he heard a great deal about Borneo from the Dutch residents and the English merchants. In Singapore and in China also, the prosperity of Borneo was a constant subject of conversation. The Dutch had been on the island for many years, and had very prosperous settlements there; but he hoped that any Englishman who undertook commercial enterprise in the island would not follow the example of the Dutch in their treatment of the natives. He hoped rather that the English mode of procedure would stir up the Dutch to treat the natives better than they had hitherto done. There were great numbers of Chinese scattered over Borneo, as well as in all the other islands of the Indian Ocean; and any one who had travelled much in that part of the world must have noticed the immense number of Chinese settlers who were continuàlly flocking to the parts where commercial enterprise was possible. For instance, at Banca it was the Chinese who worked the tin mines, and produced the tin which was brought to Singapore and to England. They were also the chief labouring class in Sumatra, and there were large numbers of them in Singapore. Many of them had flocked into Batavia, and were there the most respectable of the merchants of the place. They drove into the town in handsome carriages with four splendid horses or ponies. The European merchants generally drove in a small gig with one horse and an outrider, and kept their handsome carriages for their wives and children in the cool of the evening; but the Chinamen brought their carriages into the town. They were, in fact, the merchant princes of the Eastern Islands, and monopolised a very large amount of the commerce and wealth of those regions. He had greatly admired their skill and power in colonising places to which they went, and he regarded them as, next to the English, the best colonists in the world. They were frugal, industrious, temperate, not under the influence of the demon of drink, made for themselves a home wherever they settled down, and thus became rich and respectable members of the community. He had seen them in various places and knew their capabilities, and he believed that a great deal of the future prosperity of North Borneo depended on the way in which Chinese immigrants who were certain to come there would be treated. If the behaviour of the Government towards them was one of amiability and kindness, they would prove themselves splendid workmen wherever they went. Singapore was a striking instance of what they could do. In that place they began in a small way. They went into the country, cultivating pepper gardens and sago plantations, lived frugally, worked industriously, and laid by their accumulated wages until they became wealthy occupiers of the places in which they dwelt. They would do the same in Borneo if they had the opportunity. The action of the Americans towards the Chinese must not be imitated in Borneo. If the citizens of the United States were treated in China as the Chinese are treated in the United States, there would be great outcry and remonstrance made immediately. In the year 1840, when he was in Singapore, he had intercourse with Rajah Brooke, who had just arrived at that place and started to begin that remarkable enterprise, the successful result of which had been described in the paper. Sir James Brooke was well qualified to accomplish the great work which he undertook: he was kind and amiable and courageous, and acted right nobly as an English gentleman, so that he had left his mark upon that part of Borneo which would never be effaced. To Rajah Brooke great respect and commendation were due from all Englishmen who loved their country, and who were glad to see the sons of that country go forth into the world to carry on great and beneficent enterprises. Much fault had been found with him because of sundry attacks that he made upon the pirates in the neighbourhood of Saràwak, but those attacks were forced upon him by the frightful calamities which those pirates were constantly inflicting upon the villages on the sea-coast. Even peace might be purchased at too great a price, and Rajah Brooke could not remain quiet while the country was being depopulated. It was a good thing for Saràwak that with such an iron hand he swept those pirates from the sea. In this work he was thoroughly and worthily aided by Admiral Sir Henry Keppel. Any one who had seen what pirates did when they attacked a village, could have no sympathy with them or their actions. He believed that the success of Chinese colonisation in Saràwak would be imitated in other parts of Borneo. The work they had done for the benefit of the Dutch Government in Java was most remarkable, and they were quiet and orderly. As heathen they had vices peculiar to themselves, but still they were the best colonisers in Asia, and great results would follow the arrival of large numbers of them in Borneo. He would advise the gentlemen connected with the North Borneo Company to foster the immigration of Chinese into their territory. Labour contracts should not be entered into as in Cuba and Queensland, but they should be allowed to sell their labour in the best market. They would then work hard for the future prosperity of the colony.

The President, in proposing a vote of thanks to the author of the paper, said he had given them a great deal of information which had evidently been carefully and accurately collected. Englishmen were very apt to consider themselves the great colonisers of the world, and indeed they had done a work of which they might justly be proud. They had taken possession of and extended themselves over immense tracts of country, which were likely to perpetuate a race as vigorous and enterprising as our own; but there were certain climatic conditions which opposed their spreading in every region of the world. Although men like Sir James Brooke and Mr. Dent might lead the way in civilising districts at present inhabited by barbarous or semi-barbarous people, it was quite clear that Borneo could never be settled by persons of English race; and as it seemed to be the fate of inferior races to give way to others more energetic, it was probable that the huge islands of the Eastern seas would in process of time be inhabited by descendants of the Chinese race. There was, however, one great feature of present times which could not be overlooked. Unfortunately it could not be said that wars had ceased, but they were now generally on a comparatively small scale, and the devastation caused by them was slight indeed when contrasted with that of the wars of past days. He believed that if an accurate census could have been taken in India at the time that England became possessed of it, and if another were taken at the present day, it would be found that the population had increased by upwards of 50,000,000. No doubt, as Asia became more and more under the domination of the three great empires, Russia, China, and Great Britain, the population would increase enormously, and in process of time would overflow to the south, just as in ancient times it overflowed to the west. The west was now too strongly occupied to permit of wholesale immigration. In all probability China, with its 400,000,000 inhabitants, was destined to find an outlet in the magnificent islands to the south. The Chinese constitution was fitted to the climate which persons of the English race were unable to stand.

Notes on the Chobe River, South Central Africa.

By Dr. Benjamin F. Bradshaw.

Map, p. 256.

The accompanying map of the Chobe river is taken for about 40 miles up from its mouth, and drawn from memory, as I had no instruments with me, and went into that part of the country more with the intention of hunting and obtaining natural history specimens, than making geographical explorations; but having travelled more or less for the last six years either along the bank of the river or in a boat, its peculiar course naturally made a very great impression upon me, more especially as I have been living at nine different places along its course, for periods varying from two weeks to more than four months. The portions of the river not coloured I have not visited, but I think the supposed course marked to be about the correct one.

The course of the river, so far as I have shown, is as nearly as possible east and west; at the mouth, the river appears to be about 200 yards wide, and there is no perceptible current. On the south side the bank is about 12 feet high; for a mile and a half the opposite bank is clothed thickly with reeds, and hippopotami are often to be seen in the water.

The soil is more or less sandy, and a short distance from the bank on the south side you get a low ridge of heavy sand, as seen in the map, and coloured yellow. The grass is there very coarse and long. The shallow pan which I have marked, varies much in extent, being often quite dry in October and November; a large sheet of water is formed by the annual inundation, about a mile square.

The river is bounded on the southern side by a high sandy ridge, clothed with forest, more or less thick; the ridge in some parts recedes a mile or more from the edge of the water, but in other parts it comes quite up to it. In many places along the ridge a quantity of rocks are observed jutting out, some having the appearance of sandstone, others looking quite vitrified.

The trading station is situated nearly opposite the town of Impalera, on a sandy rise, at the edge of a small flat, which is covered with thick patches of thorn-trees, and used to be formerly the haunt of buffaloes. The position of this place, in long. 25° 19′ E. and lat. 17° 49′ S. (as also the variation of compass 18° westerly, and the height 3213 feet), I obtained from Major Serpa Pinto on the 6th October, 1878. I was at that time living there, and succeeded in prevailing upon the Kafirs to allow him to come through to this side, as he was very ill, and the natives wanted to keep him a prisoner, owing to a dispute about the rate of payment they were to receive for carrying his things from the Barotse valley. Several white men are buried here, among them a trader, named Hewitt, who is interred under a large thorn-tree, and whom we strongly suspected had been poisoned by the late king Sepopo, July 1876, at Sesheke, on the Zambesi. His body was sent down here for burial.

The most important thing at the station is the hot salt spring, the temperature of which I could not take, as my thermometer was broken, but at times I could scarcely bear my hand in it. The ground all around it is quite spongy, like a shaking bog, but on probing with a stick I found hard rock at from two to three feet depth. This spring is covered every year, when the river rises, for about three months, namely, from the end of December, through January and February, to the beginning of March, when it subsides. The salt is crusted thickly on the ground, and on all the vegetation around. It is about $\frac{1}{8}$ inch in thickness, varying in size up to four inches square. I have used a great deal of the salt, and found it pure and strong. A quiet, shallow stream, about three feet wide, flows out of it to the river, and is full of small fish, which do not seem to be incommoded by the heat of the water.

The northern bank opposite is formed by the island of Impalera, the town of the same name being situated on a sandy rise, close to the river. It is occupied by Masubias, under a chief appointed by the Barotse nation, called Makumba, but is at present deserted, owing to a civil war having broken out between the Barotse on one side and the Masubias on the other, headed by Wana-Wena, the king elected on the death of Sepopo in October 1876, and deposed in May 1878, the Masubias being assisted by a tribe from the north-east called Ma-kupi-kupi, which tribe I am unacquainted with. The Masubias succeeded in burning down Sesheke, and taking the women and children as well as the cattle; but in the first engagement they were beaten with the loss of Ra Masokatan, a Masubia chief, whom I shall have occasion to mention again. The last news I had before leaving the Zambesi in May 1879 was that the Ma-kupi-kupis had sent for reinforcements, and the Masubias were flying up the Chobe river, intending to settle at Mababe, in Khame's country, the chief of the Bamangwato.

Two stony hills covered with bush lie to the right and left, and about 500 yards to the rear of the town. The left or western one has an immense baobab-tree growing on the top at the right-hand corner. During a heavy inundation the river rises about two feet in the houses, and the people are obliged to leave there for a time.

The river here is 400 yards wide. I have often fired across it with my rifle, and with the 400 yards sight my bullet struck the opposite side above the water-line. About two miles above the trading station are the rapids, the only ones known on this river, as far as I could hear from the natives; they are caused by a chain of rocks running in a north-westerly direction, approaching more to the north, are about 800 yards in length, and also form a rapid in the Zambesi. Some of the islands in the rapids are covered with a kind of sonorous sand, which gives most doleful shrieks when walked upon; the same thing may also be noticed on the Zambesi, near Sesheke. There are several small rocky hills on the south side of the river, near the rapids, the largest standing alone, as shown in the map.

The trees about here consist of seshuma and wild loquat, both fruit-trees, various thorns, mopani, and along the river and in the islands willows and a species of scrubby yellow-wood. The country for about four miles along the river is very rocky, the sandy ridge gradually approaching the banks; it is covered with thick forest, tangled vines, scrubby bush, and long grass, and becomes the feeding-ground of numerous hippopotami at night. Under the ridge is to be seen one portion of the river coming from the north and another from the west, which latter evidently leaves the northern channel, forming an island as shown in the map. This island, as well as all the northern side of the river, as far as the rapids, is under water during the annual inundation. At that time the rivers Zambesi and Chobe are one, the whole country being one vast lake as far as the eye can reach, with here and there a tree or small island appearing above the waste of water; on the south side, the water at the same period comes up to the edge of the forest growing on the sandy ridge (marked yellow in the map). Opposite the marshes is a valley which, winding very much, extends for seven or eight miles in a southerly direction; it is covered with large kameel-thorn trees, and grass from four to eight feet in height. Near its upper end it contains a water hole, and about half a mile from the river there is a pan which is often the resort of wild-fowl. Along the edges, the bush is so thick as to be almost impassable, and a few years ago was the resort of elephants and buffaloes; the introduction of fire-arms among the natives has led to their being all driven out, and there are now only a few koodoos and pallahs remaining.

Proceeding up the river a couple of miles, the sandy ridge is found to approach close to the water, and is very abrupt and high, thickly clothed with vegetation; at the base, a row of wild date palms give it quite a tropical appearance. The two islands look very beautiful, being thickly grown with yellow-wood. The river soon turns to the northward, making a very large bend at least eight miles in length. The path here leaves the river and goes across a flat covered with long grass; the soil looks very fertile about here, and has been planted by the natives many years ago, until they were driven away to the north bank through fear of the Amandebele nation, who under Mosilikatze carried destruction through a great part of this country. Crossing the flat, Ra Masokatan's town, inhabited by Masubias, is to be seen on the opposite bank, a patch of high ground. The river here is very narrow and deep, not more than 70 yards wide; in the bank on the south side, which is very high and thickly covered with bush, are numerous fossils, as I was informed by a friend, but too late for me to see what they were before leaving the country. The sandy ridge here recedes from the river for a long distance, there being a flat above the level of the inundation, but covered with bush and several varieties of spike grass, and the resort of innumerable tsetse fly. Near the left-hand corner of Section No. 2 of my map may be seen a large lagoon, nearly surrounded with marsh, the haunt of numerous crocodiles; both sides of the river here are covered with water during the flood, and the whole country is like a lake. In Section No. 3 will be seen a large amount of swamp, and the river takes a very winding course, becoming narrow and deep, and bounded by quantities of reeds; it is one of the best parts of the country for wild-fowl from August to November.

The river rises annually from 15 to 18 feet; commencing in January it is at its full height in March, and falls until January again; it is never turbid; it fills very gradually at first, but the decline is rapid, and goes on more slowly during the winter months. The rains commence in October or November (although I have known them one year, 1873, to begin on the 29th September), and generally end in March or April. The rest of the winter is fine, with perhaps one slight shower in June or July, very often none. The prevailing winds are from the east, except during the rains, which often come up from the west. Hail-storms are very rare; I only saw three during my stay in the country: on the 19th October, 1875; 12th November, 1877; and on the 29th April, 1879. The last did considerable harm to the natives along the river, who were going to Mababe, breaking their cooking vessels and calabashes; it also destroyed numbers of guinea-fowls and francolins. The temperature at my residence at Ma Chikory Camp (Section 3 of the map) during October and November, in the shade, was from 95° to 110°.

The boats used on the river are hollowed out of the trunk of a tree, and are very good in calm water, but will not rise over waves. The fish are numerous, chiefly consisting of the silurus, a fish called *Hydrocyon Forskalii* (also found in the Nile), noted for its formidable row of teeth outside the lips; whistlers, with a long dorsal spine, supposed to poison if it wounds; three species of bream, and a kind of sucking-fish; the four last are very good eating.

The Masubias are very black in colour of skin; physically they are well developed about the chest and arms, due to rowing, but they are very lazy, great thieves and bad servants. They manage their boats well, and are perfect adepts at spearing fish. The game found along the river, though now scarce, comprises elephants, hippopotami, buffaloes, lions, koodoos, pallahs, water-bucks, pokus, zebras, harris-bucks, and a small species of bush-buck, red with white spots. On the south bank and on the north leché antelopes are plentiful, also pokus and reed-bucks.

The tsetse fly is found in great abundance on the south bank of the river, and extends back from eight to twelve miles; it is not found on the north bank in the flats; it has no effect on game, but all tame animals are killed by it, with the exception of goats. Bushmen have told me that the fly breeds in buffalo dung, and it seems to be true, for when those animals are driven out the fly almost disappears, and if the small game also was exterminated it would probably disappear altogether. However, I do not think it matters much, as I consider it no country for a white population to settle in, consisting as it does of heavy belts of sand and rocky hills, and there are so few places where water can be had.

The drought in winter for seven or eight months is also another serious drawback, and the grass in winter is bad for cattle in most places; there is also a poison plant, called by the Bushmen *machow*, which springs up in September, October, and November, when the grass is burned, and is very fatal to cattle. The usual horse sickness peculiar to the country is also very bad here.

A Journey along the Coasts of New Ireland and Neighbouring Islands.

By the Rev. G. Brown.

New Ireland, situated between lat. 2° 25′ and 4° 52′ S., and long. 153° 12′ and 150° 30′ E., has not been much visited by white men. Whalers often obtained a few supplies whilst coasting along, but not much was known of the places or the people, with the single exception of a small district at the south-east end in which are the harbours of Port Carteret, Port Sulphur, and Port Praslin, and where the French colony of the Marquis de Rays is at present formed.

In a former paper * I gave an account of the first journey across the island, at a point near Cape Rossel, N.N.E. of Port Hunter. At this place an elevation of nearly 3000 feet was obtained. From this place, going in a north-westerly direction, the range gradually decreases in height for about 25 miles, to a place called Kuramut, about 15 miles south-east from Cape Givry, when it again rises very abruptly, and trends away more to the westward. At this place, Kuramut, there seems, from seaward, to be a decided break in the land, as if the island had been at one time divided by a channel, and it was long thought that it was very much narrower there than is represented on the present charts. We often asked the natives about this, and they, no doubt thinking that we *wished* the island to be narrow there, made it narrower and narrower every time we asked about it; until finally, when I asked them if I could drag my boat across, they assured me that, with the exception of one rather difficult place, I could do so with very little trouble. I did not believe this, but still thought that it was comparatively narrow there, though I knew also that few, if any, of my informants had ever seen the place, as they were all from adjoining districts, and as a rule natives in these parts do not go much into other districts, as the fashion here is not simply to "heave 'arf a brick" at a stranger, but to kill and eat every one they catch.

On the 22nd of June, 1880, I called off Kuramut in our steam-launch, and arranged with the chiefs there to go as guides early the next morning. We then ran down the coast to pick up an anchorage, which we did outside a small island about five miles from Kuramut. Here we collected a few specimens of the coast formation to forward to Sydney for examination. This particular place in the Western Pacific is, I believe, the only place in the South Seas where any true chalk is found, it being first discovered by Professor Liversidge, of the Sydney University, in some chalk images from New Ireland, which I took to Sydney in 1876. A slight examination of the coast here showed it to consist principally of the ordinary coral limestone, with layers on the surface, in different places, of what appears to be impure chalk. The place from which the material used in making the images is obtained, is, however, much further inland, a little to the north-west of Kalil, near Cape Rossel, and is at a much higher elevation than this part; but I have not yet visited the place.

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* 'Journal R. G. S.,' vol. xlvii. p. 137.—For general map, consult 'Proceedings,' new series, vol. iii. p. 128.

The next morning we started for Kuramut, but on our arrival found no natives there to go with us. After waiting some time we got one who consented to guide us, and soon afterwards we met several others who also went with us. Our party consisted of Mrs. Brown, our little boy, myself, and a few teachers and natives of Duke of York Island. We soon found out that we had greatly under-estimated the distance, and our hopes of finding a narrow isthmus by which we could have easy access to the other side of the island were quite destroyed. The path led us over comparatively low land, winding round the base of a spur of the low range of hills seen from the coast. We walked for two or three hours, expecting every minute to see the coco-nut trees and hear the sound of the surf on the other side, when we halted by the side of a rivulet, deep down in a ravine, similar to several others we had already passed, and our guide then told us that we were nearly half-way across. We did not feel very comfortable, as we were only a small party, and we knew nothing of the character of the people whom we were going to visit. Soon after we passed through some clearings, and then the road began to descend, and we soon saw the red, clayish soil, and the open plains covered with tall, coarse grass, which characterise the east and north-east side of the island. Here, as in nearly all the islands I have visited, the east or north-east side is lower and more open than on the west and south-west side. On the former the soil is a reddish stiff clay, covered with coarse grass, with a comparatively small quantity of dense bush. Except on the mountain range on the west and south-west side, the soil is nearly all rich decomposed vegetable matter, and there is scarcely any open country except where the natives have had plantations. The mountain range descends abruptly to the beach on this latter side, but slopes gradually down to the sea nearly the whole breadth of the island on the east and north-east side. On the west and south sides the shores are steep-to, and there are no outlying reefs, whilst on a great part of the coast there are neither shore- nor fringing-reefs. On the east side the fringing-reefs certainly are much larger, and extend farther from the shore; and, judging from analogy, I should expect some shoal patches along that coast. I noticed this difference between the two sides of the island also in the Solomon Group. It is especially marked on St. Christoval and Guadalcanar. We passed through several small villages, and as the people had never before seen a white man, our appearance caused no little sensation amongst them. They were especially interested in Mrs. Brown and our little boy. We reached the beach at about 3.30 P.M. I estimate the distance at about 15 miles, though we must, from the crooked character of the paths, have travelled a much longer distance. Unfortunately I had no compass with me, but we struck the coast at a village called Bo, almost directly opposite the southern extreme of Gerrit Denys Island, which we could see quite plainly. There was a large bay, the bight of which was composed of a large shore reef, dry at low water, and extending about a mile out from the head of the bay. No such formation would ever be found on the west or south-west coast.

We occupied two small native houses, as it was too late to return that day. The natives came about us in great numbers, all armed, but apparently friendly. Our Duke of York lads, however, were very suspicious, and so also were the New Ireland men who came with us from the west coast. One of them overheard a remark which convinced him that they were going to attack us. He soon told this to the others, and this of course confirmed their own suspicions, and they were soon in a state of great excitement. I went out and quieted them, and having fortunately a good interpreter, I soon explained matters to the natives, who were getting suspicious of us. They denied all hostile intentions, and we were soon good friends again. After supper they asked us to fire some guns, as they did not seem to know what they were. After our boys had fired a ball through a bread-fruit tree and fired off rapidly the charges in a revolver, I think they were quite convinced of the folly if not of the impropriety of venturing to attack us now that we were on our guard. Next morning we started, in heavy rain, on our return. We took another route which led us over the top of the range, which rises abruptly here and trends away to the north-west. From this range we had a fine view of Gerrit Denys and the coast-line. We reached Kuramut again at 1 P.M.

We have now settled the following points:—That there is no narrow isthmus here, but that there is a tract of comparatively level land with a road across, which could very easily be improved so as to give easy access to the other side of the island; that the island is about 12 or 15 miles in width here; that it is well populated on both sides and in the interior also; that the land on the east and north-east sides is much more open and level than it is on the opposite; that the range is much further inland, and that the shore- and fringing-reefs are much larger than they are on the west and south-west sides.

Excursion to Sandwich Island, Portland Islands, and New Hanover.

Captain T. de Hoghton, H.M.S. *Beagle*, having kindly invited me to accompany him on a short cruise, we left Port Ferguson, Duke of York Group, in that vessel on Saturday, October 25th (1880), and made the land a little to the northward of Cape Rossel, New Ireland, the same day, and there lay-to for the night. Next day (Sunday) we anchored at Kuras, a few miles further south. On one of my previous visits to this place we had the most positive proof of the cannibalism of these people, as some women were actually roasting the thigh and leg of a man in a hut not ten yards away from where I was sitting. I did not know it until we left the village, as my lad was too frightened to tell me; in fact, he was afraid lest I should interfere with the operation, and so get us both into trouble. On a subsequent visit, however, the natives readily admitted the fact, and I bought the man's skull for a few beads, and brought it away with me. Had I known it at the time, I should not have felt very comfortable, as I was then the only white man who had ever landed amongst them, and I had only a native lad and a New Ireland man from another district with me.

Captain de Hoghton did not like the anchorage, and so we weighed anchor again, and with a light fair wind we stood along the coast to Cape Givry. For some distance on both sides of this cape the island is evidently densely populated, and most of the villages are on the beach. The coast here is extremely beautiful, the dark red of the many plantations on the hill-sides contrasting with the light green of the undergrowth of those recently abandoned, and with the darker green of the dense forest which covers all the New Ireland ranges, whilst the lights and shadows on the hills and ravines which intersect them in every direction combine to increase the beauty of the view.

A little to the south of Cape Givry, near a large village or district called Masalam, we saw a few coral patches a quarter to half a mile from the beach, on which anchorage might perhaps be found for small vessels in fine weather; but it may be safely stated that there is no good harbour or any secure anchorage for vessels on the west or south-west side of New Ireland from Port Carteret to Catherine Haven.

Immediately on the north-west side of Cape Givry there is a large village, situate in a fine grove of coco-nut trees. We stood quite close to the beach, hoping to find anchorage, but we found that the small shore-reef was quite steep-to, with deep blue water to its very edge.

Ten miles further north-west there is another large village, with a good quantity of coco-nut palms. We coasted along quite close to the shore, and were visited by great numbers of natives, who came off to us in small canoes. We often had from forty to fifty canoes alongside.

The people seemed most friendly, and were all very anxious to trade. Iron hoop was the article most prized.

Next day (Monday, 27th) we tried again for anchorage, but could not get one. I landed with the captain near Seelhorst Point, and we found the people quite friendly. The women all wear the little flax fringe which serves as an apology for dress. Small as it is, however, it is a little improvement upon the custom in Duke of York and New Britain, where the women as well as the men are all quite naked. Some of the men in this village also wore a few green leaves. They all distend the lobes of the ears with wood or bark, as in the Solomon Group. I noticed particularly here the custom of expressing admiration and astonishment by placing the forefinger between the teeth across the mouth, and making a hissing noise. Another mode is to slap violently the thigh, slightly lifting the leg at the same time.

On Tuesday we coasted slowly down until within a few miles of Attack Island. The natives in this part brought off great numbers of most grotesque-looking wooden masks, and also some rather elaborate wood-carvings, some of them being representations of the hornbill (*Buceros ruficollis*), and others representing iguanas eating snakes, &c. These they readily sold for iron hoop. The masks, I believe, are used in their native dances; the carvings, I am inclined to believe, are put up in houses where certain young girls are kept confined for some months or years at the commencement of puberty. I gave an account of this custom in a former paper on our first expedition across the island. There were no carvings in the houses we then saw, but I believe they form part of the furniture of those used for similar purposes at this end of the island. Two natives came off from near Attack Island on a very good catamaran, made of some soft light wood. I noticed here that all the men practised circumcision. This, though common enough in Eastern Polynesia, is the first instance I have seen amongst these islanders, and here only in this particular district.

Sandwich Island.—The south side of this island, which is about 12 miles in length, trending about W.S.W., has not been previously described. About two miles to the south-west of the east point, we landed in a small bay, called by Captain De Hoghton Deep Bay, having several small islands on its east side. The women here were very earnest in beckoning us on shore, and quite as earnest in running away from us as soon as we neared the beach. The bay was full of coral patches, and we could not find any safe anchorage for the ship. The natives were of the same appearance as those on the mainland of New Ireland, and were all armed with the same kind of spear, made of a length of betel-nut wood inserted into another length of bamboo, which is generally ornamented with figures burnt on it. They also used the same sword club, with sharp cutting edges, as is used by the natives on the mainland.

We went some distance inland, but could not find any village. A good, broad, well-beaten track seemed to lead to the opposite coast, and I think that the villages are principally on that side of the island, and that the people only visit the south side for the purpose of fishing.

Here we noticed particularly that patting the top of the head with the hand is the particular way of expressing friendship. This sign is also used on the north-west end of New Ireland, but not southward of Cape Givry, so far as I know. It is another instance of the peculiarly important, and in some degree sacred, character attached to the head by all natives in these seas. In Samoa a native will never use the ordinary word when speaking of the head of another person, except he does it in abuse, and in war they always made a great distinction between the number killed and those whose heads were got. They first counted the number of those killed and beheaded (*aulia*), and then those simply killed, but whose heads were not obtained. It was a great alleviation of their sorrow if the relatives of any one who was killed knew that his body was recovered entire, and in most instances when this was not done, some of his friends would beg the head from the conquering party, and when they got this they cared but little what was done with the rest of the body. In that group also the most respectful way of acknowledging any valued present is for the recipient of it to place it for a moment on the top of his head. The heaviest curse a Maori could speak was to tell his adversary to go and cook the head of his grandfather, or some other relative.

"Cannibal Jack," a well-known character, once told me that in the early days when he was in New Caledonia, or one of the adjacent islands, a white man who had been adopted by the chief was killed by the people because he had once playfully patted the old chief's head. The chief did all in his power to save him, but in vain, and Jack assured me that ever afterwards he was very careful not to play any practical jokes of that kind amongst savages. On New Ireland and Duke of York Island, the skulls and lower jawbones are kept as trophies, and the skulls of their own chiefs and principal men are carefully preserved and hung up in the houses of their relatives for years. In the Solomon Group, after the bodies of the dead have been for some time exposed in the mangrove bushes, the heads are all carefully collected and placed together in a rude stone cairn or small hut, generally on some small island off the mainland. At this place, however (Sandwich Island), they do not attach much value to some, as a native brought out a skull for sale, which I bought for a string of beads. This is the first instance I have ever known of their voluntarily bringing out such an article.

The south-west point of the island has been named Beagle Point. A large fringe-reef which commences some distance eastward of it takes a wide sweep off this point, extending in some places two or three miles off the coast, and having a number of large reef-stones on it. There is then a large break in the reef, forming a wide, deep channel, but full of shallow patches extending into an island which was named by Captain de Hoghton Redlands Island. This is separated from Sandwich by a channel about three-quarters of a mile broad. The west side of the channel previously mentioned consists of a fringe-reef and a number of coral patches extending south of Redlands Island for some three miles, and then uniting in a large barrier-reef, which sweeps away to the north-west, north, and north-east, having another large break in it on its north-west side, with a channel almost extending into a small coral islet called by us Archway Island. The termination of the reef on its north side was not seen, but it seemed to be closing the shore very fast when lost sight of behind the land. This dangerous reef has not been previously reported nor marked on the charts. We coasted round Redlands Island, and landed for a few hours at the site of a deserted village. There was a grove of coco-nut trees here on which there seemed to be a native tabu. Extreme thirst compelled us to disregard this, and our lad was sent up to throw down a few drinking nuts. Before we left, however, we hung up some beads and other little things far above the value of the nuts. I have always found it the safest and best plan to observe and respect, as far as possible, the customs and laws of the natives. We shall probably never visit the place again, but our having observed and respected their own custom by paying for a violation of the tabu may make it easier for any who follow us. By native custom, any party can take coco-nuts to eat and drink without payment, except when the grove is tabued as in this instance.

Portland Islands are in lat. 2° 32′ S. and long. 149° 45′ E. We made this group on October 1st. The 'South Pacific Directory' states that they are six or seven in number. We could only make out three principal islands and one small one. There may, however, be one or two more islets, but the group really contains only three islands at all worthy of the name. The same work states that they are encircled by a reef. We found only a very small shore reef a few yards distant from the beach, on the east side of the north-east island, where we landed without difficulty close to the north-east end. Any vessel could go to within fifty yards of the shore on that side. After passing the north-east point, we found that the fringe-reef extended further away from the beach, but not to any great distance. Off the south-west end, however, of the south-west island, we saw the reef extending for about two miles from the shore, and apparently forming a barrier round that end and the west side of the group. The group is very thinly populated; in fact, as far as we could make out, only the north-east island is inhabited, and there appears to be not more than 100 or 150 inhabitants on it. The natives are a nice, quiet people, so far as we could judge; in fact, during our short stay we never saw a spear, club, or any weapon whatever. Their houses were very good, and the little villages were all exceedingly clean. We walked over a good part of the island, shooting pigeons, and saw some very good plantations of taro. The people also seem to be planting coco-nuts, as we found one part almost covered with young trees which had been planted out. We saw no women after we landed, as they had all fastened themselves up in a large house. The people are of the same race as the New Ireland natives. A mask which was brought for sale was exactly similar to those purchased in New Ireland.

New Hanover.—We only anchored in one part of this island, at North Haven. This place was, I believe, first visited by H.M.S. *Blanche*, and subsequently by the German ship of war *Gazelle*, the officers of which made an excellent chart of the harbour. We anchored there on October 2nd, and were soon surrounded by canoes. A curious custom was at once noticeable. The men here blacken only one half of the teeth on both upper and lower jaw, leaving all the teeth on the opposite side of the mouth perfectly white. This is done by only chewing the betel-nut and lime on one side, and keeping the other side white with pumice-stone and earth. They appear to be of the same race as the New Ireland natives, but I noticed that their hair was slightly different in many cases. Many of the men had short, crispy, brownish-black hair, often half coloured with red paint or with lime. With the exception of a few coco-nuts and taro, they seemed to have very little to sell. We only saw two small villages here, the one reported by the *Gazelle* on West Island having been since abandoned. The houses here are all built with spear-proof walls, made by building up as high as the eaves with lengths of firewood about 18 inches in length. The canoes have only a very narrow opening, unlike the New Ireland ones, which are open the whole width of the log, and often have a plank built up on the body of the canoe. The reef which runs north from North Harbour, trends away to north-east a few miles from that port, where it seems to assume more of a barrier formation, having a number of small islands on it, between two of which, as seen from the masthead, there appeared to be good anchorage, which could not, however, be examined for want of time.

GEOGRAPHICAL NOTES.

Whymper's Journey in Ecuador.—At the Evening Meeting of the Society, May 9th, Mr. Edward Whymper will read a paper giving an account of the Geographical Results of his recent journey among the Great Andes of the Equator.

Captain Phipson-Wybrants.—The important expedition in South-eastern Africa, inland from Sofala,* under the direction and at the private cost of this promising young traveller, has come to an end through the death of the leader and his European companions by fever. This untoward event is the more to be regretted as Captain Wybrants had qualified himself by long study, under the Society's system of scientific instruction, for making a thorough exploration of these little-known lands, and great results were naturally expected. We refer our readers to the obituary notice in this number for further details.

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* *Vide* 'Proceedings,' vol. ii. p. 627.

Uguha, Central Africa.—Mr. Walter Hutley, one of the party, who, as mentioned in our April number of last year,* founded the mission station at Mtowa, on the western shore of Lake Tanganyika, has sent to the London Missionary Society a report, embodying the information he has been able to collect respecting Uguha and its inhabitants. The country is divided into Northern and Southern Uguha by the Lukuga river, Mr. Hutley's account applying to the former, in which the station is situated. The population of this district is probably from 15,000 to 20,000, and the largest village is Ruanda, with from 500 to 600 houses. Mtowa, near which the missionaries have settled, is a village of the average size, containing 90 houses and some 300 inhabitants; it is enclosed by a semicircle of hills, which start from Southern Ugoma, trend inland for some distance, and reach the lake-shore at Cape Kahangwa. Beyond these hills stretches the plain of Ruanda, watered by several small streams, of which the Lugumba is the only one of importance. The domestic animals of Uguha are goats, sheep, and fowls, but some of the chiefs possess pigeons obtained from Marungu or Ujiji. The only cattle are those belonging to the mission, though some are occasionally brought across the lake to be taken into the interior. There are said to be numerous wild animals in the hills to the north, among which are buffaloes, gorillas, leopards, monkeys, wild boars, and antelopes, but hyænas are unknown. Good timber is not very plentiful, except at some distance inland, where teak and other trees abound. Maize and millet are the only grain cultivated, though near the lake the land is in parts suitable for rice and also for the sugar-cane. Micaceous slate is found in abundance almost everywhere. The natives of Uguha are peaceable and industrious, on the whole, but rather given to drink at the close of the harvest. Physically they are a fine people, men of over 5 feet 8 inches being the rule rather than the exception. The Waguha are chiefly distinguished from their neighbours by the peculiar mode of dressing the hair, and by the fact that the men chip the two front teeth, and the women are profusely tattooed. There is but little, however, to distinguish them from the Warua, except a slight difference of language. Their first chief is said to have come from Ugoma, and settled near Cape Kahangwa, where he was joined by people from Urua and Marungu. As regards clothing, the women wear two or three pieces of fibre-cloth, dyed in two colours, while the men wear one large piece tucked under the belt, some also using the skins of monkeys and other animals as well as foreign cloth. —Kasanga, of Ruanda, is said to be the chief of all Uguha, but he in his turn is subject to some one else. In the villages regard is had to precedence in the arrangement of the houses, the *Walingwena* or slaves living in one part, and the *Wabangi* or freemen in another. The latter have elders or *Watwita*, who represent them in the councils of the elders. On the outside the houses appear like bee-hives, but the inside walls are perpendicular and some four feet high. From these walls springs the roof, the centre of which is 10 feet or 12 feet from the ground, but there is no centre post, and the rafters are simply fastened by rings of cane from the centre downwards; on the outside grass is laid very thickly and made to reach the ground. The interior is kept scrupulously clean by the women, and order appears to prevail in the arrangement of everything. The trade of the country consists chiefly in ivory from Urua, Ubudjwe, and other districts, and in home-grown corn. Of late years the men have shown a disposition to travel, visiting Unyanyembe and even Bagamoyo and Zanzibar; some go as porters in Arab caravans, and others on ventures of their own.—Dances are of frequent occurrence among the young, but Mr. Hutley has not seen men participating in them. Their musical instruments are few, and what they have are mostly borrowed from some neighbouring tribe. They have a species of cymbal, imported from Urua, which is made of iron in the shape of the letter U, and is sounded by a piece of stick with a head of india-rubber. This is used by chiefs and messengers on their journeys, and on it are made certain sounds which are only understood by the initiated. Each house has two sets of utensils, one for cooking and fetching water for the males of the family, and the other for the females. If the fire of one kitchen goes out, care is taken to get fuel to light it again from a fire of the same kind. The chief has his water fetched by one of his wives, each of whom performs this duty in turn. Taking the water-jar and the chief's charms, she proceeds to the watering-place without speaking to any one she may meet, and returning also in silence deposits the water-jar and the charms in their respective places. If it should be time for a meal, she keeps silence until the food is prepared and placed in her house, to which the chief retires by himself, closing the door after him. When his meal is finished, he calls to his wife who is waiting outside; she then takes a twig or a piece of straw, and gives one end to the nearest person, who breaks it, and she then goes in to clear away the chief's dinner-mat. Her silence is then over until the time for another meal arrives. When the chief is drinking, and any of his wives are present, it is usual for them to go behind a screen, or for two of them to hold up a cloth in front of him. Boys have the two front teeth chipped in their seventh year, and the girls are tattooed at about the same age. The Waguha are very fond of meat, and will eat the flesh of almost any animal, monkeys being looked upon as a delicacy. In their social intercourse they are somewhat punctilious, and each rank has its proper salutation for those of inferior or superior degree. The chiefs do not possess absolute power over all their people, but only over the slaves or *Walingwena.* The *Wabangi*, or freemen, can leave at any time they choose, on returning the calico or beads which they received from a chief to induce them to come and build in his village. Polygamy is almost universal, especially in the case of the chiefs, some of whom have been known to have 400 wives; the freemen generally have two each. When the wives are not very numerous they have separate houses. Girls are married in extreme youth, and sometimes to men old enough to be their fathers. The price given for a wife varies from a few strings of beads to two or three slaves.—The burial customs of the Waguha are peculiar. They generally keep the body of the deceased in the house for ten days or more, and it is never buried until long after decomposition has set in; sometimes the period which elapses is so long that little besides the bones remains. Ordinary freemen are buried in a grave with mats over them, but chiefs are placed in a sitting posture and with all their finery on. The interval between death and burial varies, one of the customs which regulate it being the appearance of the deceased to his successor or nearest relative in his dreams. After this is supposed to have occurred, the burial takes place, and a small hut of sticks and grass is built, in which are placed some of the medicines or charms belonging to the deceased, as well as a little meal or other food at stated periods. Mr. Hutley does not furnish much information respecting the religious notions of the Waguha, but his colleague, Mr. Griffith, has lately sent home a brief report on the subject, which concludes with the following paragraph: "The nearest approach to the idea of a divine being is in the belief in their great spirit *Calumba.* To him they assign a certain location, but they do not point upwards to the heavens as we do. They say *Anakaa ndani* ("he dwells inside"), as if trying to express some unknown country, or more properly some unknown world or other. In this indefinite place Calumba dwells, and to this place, wherever it is, the departed spirits go after death. They are welcomed by hosts of *Wamangulwa* (? angels), and they are brought before the great spirit Calumba, who judges of their previous life, and rewards the good and punishes the evil."

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* Vol. ii. p. 248.

New Station at Mamboia, East Central Africa.—In January of last year Mr. J. T. Last, whose account of some of the East African tribes we noticed* in December 1879, founded a new station of the Church Missionary Society at Mamboia, 40 miles east of Mpwapwa, in the chief district of the Wakaguru, which is entirely surrounded by mountains.

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* See vol. i. p. 788.

He chose a spot for the station in an elevated position, probably about 1000 feet above the sea, but which is reached by an easy road, and has four or five large villages close by. The whole of the Mamboia district is readily accessible from this place, and by descending the mountains on the north side, it will be easy to reach three large districts of the Wakaguru and the Wanguru. There are three springs of good water always running there, and wood is plentiful. The people are described as far superior to the Wagogo, for they are not afraid of work, and they gave Mr. Last ready assistance in his building operations. Friendly relations are well established with the chief, and when Mr. Last paid a visit to Zanzibar in April he sent his son and nephew with him. The land at Mamboia, Mr. Last says, is very good; he believes it would grow any kind of English seed with careful cultivation. He has made successful experiments with beans, peas, carrots, turnips, lettuces, onions, and sweet potatoes, and Dr. Kirk has also given him some coffee seeds to try, as he thinks that, if coffee would flourish there, it would be the best article to cultivate in order to make the station self-supporting.

Publication of a New Map of Africa by the Society.—The eastern portion of a large map of Equatorial Africa, which has long been in preparation by Mr. E. G. Ravenstein, under the direction of the Scientific Purposes Committee of the Council, is now nearly ready for publication. The map, as engraved, will be a reduction of the original drawings, and will be on the scale of 1 : 1,000,000 (15¾ miles to the inch). It will embrace the eastern half of the continent, between 10° N. and 20° S. lat., and 25° and 52° E. long.; thus including the whole of the equatorial lake region, the upper courses of the Congo and the Nile, and the eastern side of the continent from Somâli-land inclusive to the region immediately south of the Zambesi. It will be published in 24 sheets, each 22 inches square, enclosed in a wrapper. In compiling it Mr. Ravenstein has had the advantage of consulting many manuscript documents, besides all the published material accessible. The terms on which Fellows of the Society will be able to obtain copies of the map are stated in the advertisement sheet of the present number of the 'Proceedings.' A Bibliography of African Geography and Travel, also prepared by Mr. E. G. Ravenstein, is in a state of forwardness, and will eventually be published as a companion to the map.

The Connection of the Aral and Caspian Seas.—As recent experience has shown that it will be extremely difficult to fill the Uzboi bed with the waters of the Amu-Daria, attention is being directed in Russia to another plan for opening a water-way between the Caspian and Aral Seas. The proposal is to utilise the dry bed of the Chegan river, north of the Ust-Urt plateau, which at its upper part is only about 65 miles from the Sea of Aral, and probably not at any great elevation, as the plateau which dominates it is but 700 feet above the level of that sea. An additional recommendation of this plan is the fact that a deep and wide valley, known as the Arys, runs from the Bay of Chuché-Bas in the direction of the Chegan. As the level of the Aral is 243 feet above that of the Caspian, it follows that, if communication be opened to the bed of the Chegan, a considerable part of the waters of the former sea will flow towards the latter.

A Visit to the Miao-tsze Tribes of South China.—Mr. Broumton, of the China Inland Mission-station at Kwei-yang-fu, last year paid a visit to the Miao-tsze tribes near Hwang-ping-chow, in the Kweichow province, having been invited to attend one of the large festive gatherings which they hold among the hills in the spring. He thus had a favourable opportunity for observing the habits of these people, about whom but little is known. The tribes with which he came in contact, are known as the Black Miao, from the colour of their dress, and the Ka-tow Miao. On the day appointed for the fête the scene on the hill-top and slopes was a novel one to Mr. Broumton; everywhere were seen groups of women in their picturesque costumes and men in their simple clothing of black cotton, so much more convenient than the flowing skirts of the Chinese. The men of both tribes dress alike, wearing short jackets with tight sleeves and loose trowsers all of black calico. The women of the Ka-tow tribe dress their hair in a high roll, and wear a printed cloth on their heads, which is kept in its place by bands of red and white; their skirts are closely plaited like a Scotch kilt, and reach down to the knees, looking heavy and stiff; their legs are bound round with cloth worked in patterns of red and white, and they wear a jacket with tight sleeves and a band of printed cotton round the arm. A curious article in their dress is a sort of apron with shoulder-pieces, reaching below the waist, but, Mr. Broumton observes, it cannot be intended as an apron, as an exact counterpart is worn behind, and some wore two or three, one over the other. Many of the Ka-tow women had enormous silver earrings, hanging down nearly to the shoulders; some also wore bracelets, and nearly all had large silver rings round their necks. The dress of the women of the Black Miao tribe differs from the foregoing. Their skirts are closely plaited, and reach down to the ankles, with a border of fancy work near the hem. They wear a black cotton cloth bound round the head, and their jackets are short, with a band of beautiful silk embroidery round the wrists and up the seam at the back of the sleeves. All their clothing is black, and in many cases woven and dyed by themselves. For earrings they wear large discs of silver thrust through the lobe of the ear, and like the Ka-tow women they use solid rings for necklaces and bracelets. At the gathering Mr. Broumton attended, the great features were the music and the dancing. The musical instruments, which are not easy to describe, are called *Ki* by the Miao-tsze, and *Liu-shêng* (six sounds) by the Chinese. They consist of long bamboo pipes (usually six, but sometimes only two), inserted into a wooden mouthpiece. Some of these instruments are very large, the pipes being fully 18 feet in length. One long pipe runs down through the mouthpiece into a cylinder, made of the hollowed trunk of a tree, which in some instances is five feet long and a foot in diameter. Two of the pipes at their upper ends are inserted into sections of large bamboos of different sizes, varying from 18 inches or a foot in the larger instruments to three or four inches in the smallest. These *Ki* are reed instruments, with tongues neatly made of brass, and a set costs about thirty shillings. It requires a great effort to blow them, and they produce a strange booming sound, which can be heard at a great distance. While playing their instruments, the musicians moved slowly round the field, keeping their faces towards the centre; and outside them the young women danced, moving round in the same way. There were five or six of these bands present on the occasion, each with its circle of dancers. The ceremony is said to be of a religious character, and the Miao-tsze have a tradition that, if it is not performed, they will have a bad year.—On the whole, Mr. Broumton liked the appearance of the Miao-tsze very much; they seemed active and manly, and their women strong and hearty, forming a striking contrast to the Chinese women.

Further Explorations in New Guinea.—The Rev. James Chalmers has forwarded to the London Missionary Society an account of a journey which he made last August, in company with the Rev. T. Beswick, to the Kabati district, on the Aroa river, behind Redscar Bay, in continuation of his previous search * for more healthy missionary stations than are at present occupied on the coast of New Guinea. Starting from Port Moresby, the party proceeded to Boera and Manumanu Harbour, into which three rivers flow, one being the Aroa. About 10 miles from its mouth the Akevailui falls into this river, above which point the Aroa shallows very much. Near the mouth are extensive mangrove and sago-palm swamps, but a few miles up some fine country was seen on both sides, and above the confluence of the Akevailui there were beautifully-kept plantations on both banks. This district is known as Kabati, and comprises twelve villages, surrounded by fine, flat country. Mr. Chalmers mentions that the villages and houses are particularly well kept, and that the houses of the principal people have large covered verandas in front, different from anything he has seen before; and although he has visited a great many districts in the island, he has nowhere experienced so much kindness from the natives as in the Kabati villages. Mr. Chalmers furnishes a few particulars respecting the manners and customs of the people. The men, he says, have their persons covered, and the women are very neatly dressed with petticoats made from the young leaves of the sago-palm, dyed red, yellow, brown, and black. The women do not shave their heads, as is done along the coast, but allow the hair to grow long, and tie it up on the tops of their heads. The young women use large quantities of shells of various kinds for the purpose of ornamenting their dress. Daughters of chiefs, when they are about twelve or thirteen years of age, are kept indoors for two or three years, and are never allowed on any pretence to descend from the house, which is so shaded that the sun cannot shine on them. When the time arrives for one of them to be introduced into society, a great feast is prepared, to which all the principal young men of the neighbourhood are invited. The food is brought to the front of the house, where, when the young lady descends, it is divided, and dinner being over, dancing begins; the prisoner of the last few years then mixes with the crowd, and selects her favourite, presenting him with a betel-nut. She is afterwards allowed to go about as she chooses.—After a brief sojourn in the Kabati villages, Messrs. Chalmers and Beswick started on an inland journey under the guidance of Naimieru, chief of the village of Ukaukana. They passed through very fine level country, studded with plantations of bananas and yams, into a belt of thick low scrub, with swamp close in to the hills, and then crossed the Akevailui on a native suspension bridge made of cane, similar to the Dyak bridges of Borneo. This river, which is deep, and contains a large body of water, rises in the Owen Stanley range, and flowing west, falls into the Aroa a few miles below Kabati. Some miles further on, the party crossed the Maikona, an affluent of the Akevailui, and after another six miles' march, the Mabina, a small stream, which also flows into the same river. Two miles beyond the village of Revareva they crossed the Enona, which runs swiftly over slippery shingle, and is broad and deep. Then, passing through swamp into a splendid forest of very lofty trees on to higher ground for some miles, the party descended to cross the Varemenana, a broad stream, which apparently flows from the Yule range, at the back of Hall Sound, and traversing forest and swamp, came to Iduna, whence they returned to the coast through the Kabati district. When at Iduna, Mr. Chalmers noticed that several of the men had shell ornaments, which he knew could not have been obtained on the coast on that side of New Guinea, and on inquiry he heard for the first time of trade being carried on with the northern coast,—to which, he adds, he hopes shortly to pay a visit.

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* See vol. ii. p. 315.

The Reported Discovery of Relics of Leichhardt's Expedition.—In continuation of a note published in our June number* of last year on the subject of a supposed recent survivor of Leichhardt's expedition, our Associate, Mr. Eccleston Du Faur, has forwarded copies of the telegrams he has received reporting various fresh discoveries lately made in connection with this matter. On January 8th, Mr. J. R. Skuthorpe telegraphed to him from Blackall, Queensland: "Have found Classen's grave, and fate of Leichhardt." In subsequent telegrams he stated that he had recovered Leichhardt's and Classen's journals, the former for the whole of his journey, and that among the relics which he has secured are a compass and a telescope, with Leichhardt's name engraved upon it, as having been presented to him by the Governor, on behalf of the people of New South Wales, before he started on his ill-fated journey.—No further details have yet been received, Mr. Skuthorpe not having reached Sydney at the date of the departure of the last mail, but we hope to be able to furnish full particulars in our May number.—We understand that, by a somewhat curious coincidence, the proprietors of the *Sydney Bulletin*, in December last, offered a reward of 1000*l*. for the discovery of the fate of Leichhardt's expedition, and it was thought probable that some enterprising party of bushmen would shortly attempt to clear up the mystery.

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* See vol. ii. p. 375 *et seq.*

Exploration at the Southern End of the Gulf of Carpentaria.—In accordance with instructions from the Colonial Secretary of Queensland, Captain C. Pennefather, of the Government schooner *Pearl*, undertook a further* voyage of exploration in the Gulf of Carpentaria in September and October of last year, his official report of which has lately been published. He started from Thursday Island on September 8th, and proceeded, in the first instance, to Sweer's Island, on the east side of Bentinck Island, in order to procure a supply of water. Sweer's Island is about five miles long and one mile broad, is lightly timbered, and has a loose, sandy soil. Captain Pennefather remarks that the site of the once thriving township of Carnarvon is only to be recognised by heaps of broken bottles, marking the positions of the various buildings which have now totally disappeared. On an old tree is to be seen the name of H.M.S. *Investigator*, with the date 1802, and a still earlier date supposed to have been carved by the Dutch. There are two coco-nut trees on the island, thriving and bearing well, besides guavas, dates, tamarinds, &c.—the climate being apparently well-suited for the growth of such like fruits. Captain Pennefather also visited Bentinck Island, which he describes as fairly grassed, and timbered with stunted bloodwood, Moreton Bay ash, fig-trees, &c. He saw there a large number of natives, who did not allow him to approach them. The island is about ten miles long and five or six miles broad, and on the south side there is a fresh-water lake. On Fowler Island, lying between Bentinck and Sweer's Islands, tamarinds, supposed to have been planted by the early Dutch navigators, are growing and bearing luxuriantly. On his way to Point Parker, on the mainland, Captain Pennefather touched at Allen Island, which is about as large as Sweer's Island, and similar to it in its north-west portion. At the south end stunted timber is plentiful, and the surface of the soil is of a gravelly ironstone nature on a pipe-clay foundation. At Point Parker Captain Pennefather reports that there is a ledge of rocks running out towards the north-west, and forming what, with a little assistance from engineering skill, would be a natural breakwater. On landing, the first thing he noticed was that the natives build exactly the same kind of fish-traps as those of the islands in Torres Straits, viz. stone paddocks covering several acres in extent, in which fish are left by the receding tide. The soil at Point Parker is of a loose, sandy nature, except in the beds of what in the wet season would be watercourses, and there it is black. The timber consists of Moreton Bay ash, fig-trees, stunted bloodwood, pandanus, and a beautiful, shady tree, which Captain Pennefather had not before seen. Fresh water in abundance can be procured at a depth of two or three feet, and native wells are numerous, but no rivers or creeks were seen at Point Parker. The country around consists of undulating plains, divided by belts of timber, and further inland becomes more elevated. Game, in the shape of emu, wallaby, turkey, duck, and pigeon, is very plentiful. No natives were actually seen, but from the deserted camps and tracks they were evidently numerous. The coast to the south-east is clear of mangrove, sandy ridges extending to the beach, and further on to the S.S.E. the country appeared to improve. On September 30th Captain Pennefather started in the whale-boat to ascertain if it would be practicable to take the *Pearl* to Bayley Point, 10½ miles to the north-west. Four miles from Parker Point he went up a salt creek for a mile, and landing, walked inland for about four miles, when, from the top of a ridge, he saw what appeared to be a beautiful limpid lake, about two miles in diameter, and what seemed to be the beach round it, and the reflection of the trees in the water. On investigation, however, he was much disappointed to find that he had been deceived by a mirage on a large salt-pan, which seemed to stretch nearly to Bayley Point. Proceeding along the coast, Captain Pennefather landed at Bayley Point, which consists of a gravelly ridge, extending two miles east and west, and a mile broad. The timber is of the same description as mentioned before; several large native camps were seen, but the people ran away on the approach of the party. Behind the ridge nothing but low, salt-pan country was to be seen, with a salt-water creek to the southward. The coast to the west of Bayley Point, as far as could be seen, appeared to be low and fringed by mangroves, with mud-flats extending for a considerable distance out to sea. It is worthy of note that the natives in the part of the gulf visited have no canoes, but cruise about on V-shaped rafts. Captain Pennefather's report is accompanied by a large-scale map (one inch to the mile), on which are shown the nature of the country, the soundings taken, and other details.

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* See *ante*, p. 102.

Exploration of Nullarbor Plain, South Australia.—During last year Mr. James W. Jones, of the Survey Department at Adelaide, spent several months in examining a large tract of country to the north-east of Eucla at the south end of the boundary line of Western Australia.

As the result of his labours, he has compiled a plan which furnishes a complete description of the country from the coast to the route followed by Mr. Ernest Giles in his journey to Perth, and embraces the entire extent of Nullarbor Plain within South Australia, covering an area of 16,500 square miles—a region hitherto comparatively unexplored. Mr. Jones also submitted to the Surveyor-General a report,* accompanied by journals giving a minutely detailed description of the country traversed, from which the following particulars are obtained.—Instead of showing a decreased rainfall inland, the observations made prove that, especially on the northern side of the plain, and at any rate in the earlier part of the year, the rainfall had been much larger than on the coast. Mr. Jones' impression is that the north side of the plain has a fair general rainfall, almost, if not quite, equal to that on the seaboard, and that in most years the whole of the plain shares in a rainfall sufficient to keep the salt, cotton, and other good bushes in fair growth; and from the nature of the soil a few inches of rain will not only do this, but also bring up a good growth of succulent herbage. Some comparatively small portions of the plain are occupied by shrubs of very little value, such as broom-like cremophila and different varieties of blue bush; but, for the most part, there is a thick growth of good sheep bushes, such as salt and cotton bush, which uniformly cover the ground; in some parts, too, and generally on the north side, luxuriant herbage was met with. As regards the surface soil, although there are parts where the rock approaches very near the surface, the entire area has, on the whole, a fair depth of rather friable loamy soil, with many extensive valleys and flats of rich red loam. The whole of this part of Nullarbor Plain is occupied by crystalline limestone, containing marine fossils, which was ascertained by examination of the numerous caves and blowholes, and the wells sunk near the Bight, as well as those at Ooldea and near Pedinga.—The country invariably rises from the sea-cliffs; the north side of the plain, near the boundary, was estimated to be 600 feet above sea-level; further to the east it was 450 feet, and at Ooldea 250 feet, while the Ooldea range reached an elevation of 650 feet.—During his second journey, in about S. lat. 31° 6′ 10″, Mr. Jones met with a cave 100 feet deep in the crystalline limestone, with large chambers extending several hundred feet east and west. After passing down the small pipe-like entrance and through the first chamber, the darkness became intense, and it was only by the aid of candles and firesticks that further examination was possible. Mr. Jones only saw a comparatively small part of these immense caves, as passages and chambers seemed to branch off in all directions. In concluding his journal, Mr. Jones states, with reference to the very numerous and somewhat remarkable "blowholes" in the limestone formation, that there were many similar cavities without the escape of air. He thinks that this "blowing" invariably occurs only when there are other large cavities in the immediate neighbourhood, and that the force and direction of the wind have an important influence in the matter. At several holes he was able to satisfy himself that one day, with the wind in a certain direction, there was a strong current of air escaping, sufficient to blow back even flat stones thrown into the mouth of the hole; while on the following day, with a change of wind, the air was passing downwards into it. These cavities vary from 10 feet to 100 feet in depth, and from 1 foot to 10 feet in diameter, and are generally in the form of a circular and almost vertical shaft, with fissures and small passages at the bottom.

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* We are indebted for a copy of this to the courtesy of Mr. S. Deering, Assistant Agent-General for South Australia.

Voyage of the 'Oscar Dickson' steamer to the Yenisei Gulf in 1880.— We are favoured by Mr. Oswald J. Cattley with the following translation of M. Sibiriakoff's own account of his adventurous voyage last autumn to the mouths of the Ob and Yenisei. As our readers will remember, the voyage was undertaken as part of the scheme, now being carried out with so much courage and perseverance, for the opening up of a trade-route viâ the Arctic and Kara seas with the great Siberian rivers. Mr. Cattley was at Tobolsk at the time of the arrival there of M. Sibiriakoff, in midwinter. He informs us that he intends himself to go out to the Ob next summer on a trading expedition, and that a Danish company has been formed at Copenhagen with the object of developing the same trade-route. The winter had been an unusually mild one in Siberia, and it was believed next season would be a most favourable one for the navigation of the Kara Sea.

The s.s. *Oscar Dickson*, Captain Nielson, sailed from Gothenburg on the 9th August and reached Hammerfest on the 16th, where I joined her, and we started for the Yenisei river. At Vardo we replenished our bunkers with coal, and on the 24th August we reached the Yugorski Straits, having accomplished the distance between that point and Vardo in a little over three days. We anchored off the little village known as "Nicholsk," in which we found about fifteen Russians from Pustozersk on the Petchora. These men annually come by boat to Nicholsk about the second week of July to obtain seal blubber, and return home by means of reindeer about the middle of October. They sell their seal blubber afterwards chiefly at Tcherdin.

We left our anchorage on the following day, and had hardly reached the mouth of the straits when we came to ice, through which we could find no opening eastward. Captain Nielson proposed trying the Matoshkin Straits, for which we accordingly shaped our course, and following the face of the ice we re-entered the Arctic Sea through the "Gates of Kara" (there was ice on the northern side of these straits), and reached the Matoshkin Straits on the 30th August. On steaming through to the Kara Sea, we again found our way barred by ice, so we followed the face of the ice in a northerly direction until near Cape "Five Fingers." As the ice closed in with the land, we could go no further, and we had to retrace our road into the Matoshkin Straits. We anchored in Beluga Bay, where we lay for three days, a heavy north-west gale blowing the while. On the 4th September, thinking it probable that the gale might have effected some change in the position of the ice favourable to us, I proposed to Captain Nielson that we should make a renewed attempt, and we accordingly re-entered the Kara Sea, and found that the ice had indeed receded considerably further from the coast. Steering a northerly course, we again followed the face of the ice, and so reached Cape Middendorf, where, however, the ice again closed in to the land, and a clear sky overhead proved that it stretched to some considerable distance northward. We were consequently obliged to back. On reaching the west entrance to the Matoshkin Straits, we observed on the north shore a cross, surmounted by the Russian flag. Captain Nielson went ashore, and at foot of the cross, in a bottle, discovered a letter written in German, signed by Captains Dahlman and Burmeister, to the effect that Baron Knoop's expedition to the Yenisei, consisting of the *Louise* and paddle-wheel steamer *Dahlman*, had put in here on the 10th August, that the straits had then been clear of ice, but the entrance to the Kara Sea blocked, and that the expedition had then on the 12th August left the straits with the intention of endeavouring to effect a passage round by the north of Novaya Zemlya.

On the 11th September we again arrived in the Yugorski Straits, and anchored off Nicholsk. We had been joined about two hours previously by the sailing ship *Nordland*, Captain Arnesen, chartered by me in Norway for a voyage to the Yenisei. On the 19th September, the *Neptun* s.s., Captain Rasmussen, arrived in the straits, homeward-bound from the Ob. While lying at anchor in the straits we transferred the greater part of the *Nordland's* cargo, consisting chiefly of coal and salt, to the *Oscar Dickson*, leaving the former with enough cargo on board to ballast her, and on the 20th September, taking the *Nordland* in tow, we began our passage across the Kara Sea. We steamed nearly full speed, and saw less and less ice the further north we got, till at last, when we sighted the Yalmal coast, we saw none at all. The first new ice we came across was near White Island, and at dawn of the 23rd September, off Cape Matte Sale, we got among heavy new ice. All that day and the following night, a strong north-west gale blowing, we had to tack about among ice, searching for a passage, to which I attribute the mischance which afterwards befell us. Failing our finding a passage to the Yenisei, we had decided upon entering the Gulf of Ob, when on the morning of the 24th our "look-out" from aloft reported land in sight to the westward. Both captains concluded this must be Cape Matte Sale, on the west coast of the Yenisei. Not far from land, and following the coast-line, we observed a channel of clear water, which we entered, and about four hours later could distinguish land on our port side also. This the captains took to be Sibiriakoff Island. Towards evening both vessels ran on to a shoal, where during the night they were imprisoned by the surrounding ice freezing together. In this position we remained for upwards of a fortnight, during which time we made preparations for passing the winter there. We arranged our living quarters on board of the *Nordland*, weighed over all our provisions, and took the *Oscar Dickson's* engines to pieces. Captains Nielson and Arnesen meanwhile made a trip ashore, where they put up a post with an inscription and the Russian flag. They met with one Samoyede, but were unable to find out from him where his camp was. A few days later I went ashore myself with a few of the crew; on which occasion we saw reindeer in the distance, but failed to discover any Samoyede tents. We had begun planning a pedestrian expedition to Dudinka, when on 12th October a heavy gale came up from the south-west. In the morning there were cracks in the ice, which presently broke up all round us, and we found ourselves floating in four fathoms. In company with the *Nordland*, we sailed with the ice in a northerly direction until towards evening of the next day, when both vessels were brought up in standing ice, the *Nordland* fast, in three fathoms water, and the *Oscar Dickson* not far from a channel of open water, in two fathoms. We immediately determined to reconstruct the steamer's engines, force our way to the open channel, and follow it south as far as we could. We took the crew of the *Nordland* on board of the steamer, and on the 16th October steamed away southwards. The channel we were following proved to be generally from six to eight fathoms deep, but we found it shoal whenever we attempted to steer more to eastward. We had occasionally to pass through belts of ice 1½ to 3 inches thick, which, however, was easily accomplished under full steam. At length, on the evening of the 19th September, having left the *Nordland* some 100 versts astern of us, Captain Arnesen from aloft reported that he saw land on either quarter, to north and to south, we being nearest to the north coast. At the same time the water became shallower, and the open channel contracted more and more. The water likewise became fresher as we proceeded. We decided upon stopping and making these our winter quarters, as close inshore as possible. We succeeded in getting up to within about one mile of the land, and dropped anchor in four fathoms. The ice we were alongside of stretched right up to the shore. Next day Captain Nielson with some of our men went ashore, which he had hardly reached before he met some Samoyedes—three men and a boy with five sledges. Having seen the steamer, they were on their way to it. We asked them on board, and I then asked them to convey us to Obdorsk, and they agreed to take three of us. Accordingly, with two engineers from the Motala Shipbuilding Works, Frazer and Linholm, and taking a supply of provisions to last us a little over fifty days, I started with the Samoyedes that same day. We did not reach Nadim until the 23rd December. On the 18th December we came across the first Russians, about 70 versts from Nadim; these were the crew of Trofimoff's ship which was stranded near at hand. The Russians had built themselves a hut on the shore, and intended awaiting the opening of the navigation there. We are indebted to these men for replenishing our failing stock of provisions. At Nadim, the Tobolsk merchant, A. S. Holin, and his wife, gave us a welcome. He has a well-built log-house and a warehouse there. Mr. Holin intending to go himself to Tobolsk next day, the 24th, we parted with our Samoyedes and joined him. We had hitherto travelled with two reindeer attached to each sledge, now we had four to each, and we reached Obdorsk on the 29th December, seventy days after leaving our steamer. From Obdorsk, by the usual post-road, we reached Tobolsk on the 11th January, 1881.

While at Obdorsk, I engaged the interpreter Konieff to proceed with light reindeer sledges to the steamer (taking one of the Samoyedes who had brought us to Nadim to act as guide) and to bring back at the least ten of the crew as speedily as possible. I sent nothing by him except warm clothing for all the men. Konieff reckoned he would reach the steamer in half the time we had taken to come from it. We had taken nearly two months in making the journey, but during this time had actually travelled only forty days, the other days being taken up in resting the reindeer or in keeping snug during bad weather. On a travelling day we probably did not accomplish more than 10 miles' distance, taking up about seven hours' actual moving per day, mostly at foot's pace, and making long and frequent halts. Such was our usual rate of progress, but when crossing the Gulf of Taz, the river Nyda, and the Bay of Nadim, we proceeded at a trot, and our reindeer did eight hours' drawing per diem, and we also got on faster when we left the land near the "Turn" Cape and got into the Gulf of Ob.

I further engaged a man named Ivanoff at Obdorsk, whom, with reindeer hired for the purpose, I despatched independently of Konieff, also to the steamer with provisions, although I anticipated no scarcity of these, even should the winter be a long one. I also agreed with Ivanoff that he should stop on board the steamer until the reopening of the navigation. With a little care, the stock of provisions on board the steamer, especially as the number of mouths would soon be reduced numerically, should last for several months. As regards fuel, there was an ample supply of driftwood in the vicinity of the steamer's winter quarters, added to which she had still a few tons of coal on board.

During the whole time of our journey from the steamer until we reached Obdorsk, we experienced mild weather, two or three days only excepted about the end of November. It is possible this may have been an exceptional winter, and it is impossible to gather any information whereupon to state with certainty what the temperatures of winters on the Gulf of Ob generally are. Holin told me that during the three winters he had lived at Nadim, he had observed that southerly winds usually prevail during the winter, and northerly in the month of May. Very possibly this may influence the temperature of localities situated in the neighbourhood of the Kara Sea. However, the nearer we got to Obdorsk the colder we found the temperature. According to the observations taken by my captain, our steamer lies about the 72nd degree of north latitude, and near the west coast of the Gulf of Yenisei. Owing to refraction and to thick weather, they could not get accurate observations. The Samoyedes, on the other hand, with whom we conversed through an interpreter on arrival at Nadim, state that the *Oscar Dickson's* position is the west side of Cape Matte Sale, in a gulf which they call "Gyda," an affluent of the Ob and not of the Yenisei, and that she is not far from the mouth of a large river which falls into that gulf, a river which, at its mouth and for about 20 miles higher up, has a depth of from three to four fathoms.

Visit to the Sepatynim Affluent of the Rio Purûs.—Towards the end of last year Mr. W. Thwaites Duke, an agent of the South American Missionary Society, when at São Domingos, 60 or 70 miles below his regular station of São Pedro de Caxoeira, made another * attempt in the *Pioneer* steam-launch to visit the Indians on the river Sepatynim (or Sepatiny), which enters the Purûs on the right bank at a point about two hours' run from São Domingos. As the main river was then low, he had to encounter a considerable current at the outfall of the Sepatynim, but after ascending for some distance, he found the current more moderate. He journeyed for three days against the stream before his Hypurina guide informed him that he was near his destination, and on the evening of the third day reached the mouth of a lake where the hut of a chief was said to be. As there was not enough water for the *Pioneer* to enter the lake, he went further up the river to a spot where a scarcely perceptible path through the forest led to the same hut. On reaching it, however, he found to his great disappointment no one there, and no sign of any human being having entered it for at least a month previously. As the river had commenced to fall, it was necessary to return as quickly as possible, and some difficulty was experienced in getting the *Pioneer* out of the Sepatynim.

Projected Exploration of the Valley of the Rio Limay and the Cordillera of the Andes.†—Lieutenant J. J. Rohde is about to be sent to explore the valley of the Rio Limay, from its confluence with the Neuquen to Lake Nahuel-Huapi. His investigations will be directed to the flora and fauna of the region, and to ascertaining the navigability of the Limay and the lake from which it issues; and he will also examine the country with a view to the establishment of colonies. The main object, however, of his expedition is to search for the Bariloche Pass in the Cordillera, discovered by Père José Guillermos in 1715, by which it was said that Ralun, on the western slopes of the Andes, opposite the island of Chiloe, could be reached in three days. The shortest possible route between the Atlantic and the Pacific would thus be opened, to the great benefit of vast tracts of country which are at present almost deserted.

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* See vol. ii. p. 128.

† For map, see R. G. S. Journal, vol. xxxiv. p. 205.

The Third International Geographical Congress.—The Geographical Society of Italy has published the programme of the meeting of this Congress, which will be held at Venice on the 15th September next, and close on the 22nd; together with that of an International Geographical Exhibition which will be held at the same time and be open from the 1st to the 30th of the same month. Both are under the patronage of H.M. the King of Italy, and the Presidency has been offered to the Duke of Genoa. The Congress includes three classes of members, Honorary members, Donors, and Subscribers. The subscription to subscribers is 15 francs; a donation of not less than 40 francs being necessary to qualify for the second class, or that of Donors, and Honorary members being nominated by the Committee of Arrangements. The Congress will be divided into eight sections, viz.:—

1. Mathematical geography, geodesy, and topography.
2. Hydrography.
3. Geography, physical, meteorological, geological, botanical, and zoological.
4. „ anthropological, ethnological, and philological.
5. „ historical; and history of geography.
6. „ economical, commercial, and statistical.
7. Methods of study; teaching and diffusion of geography.
8. Explorations and travels.

Each Section will elect daily its President, but a permanent Vice-President and Secretary for each will be appointed by the Council before the meeting. In the discussions speakers will be free to address the assemblies in any language. All Geographical Societies are invited to send representatives to the Congress, and to obtain the co-operation of scientific men, travellers, publishers, and cartographers. The Italian Government has nominated a delegate to represent each of the following Departments of its Administration, viz.: Public Instruction, Agriculture, Manufactures and Commerce, War, Marine, Foreign Affairs, and Public Works. It has also invited the Governments of other countries to name Commissioners for the purpose of taking charge of the objects to be sent to the Exhibition by the people of each. The Committee of Arrangements has prepared a limited and preliminary list of the questions to be submitted for discussion by the Congress, of which copies have been distributed among Geographical Societies and experts throughout

Europe, who are invited to suggest other questions which they consider may be added to it, to be sent in before the close of April, in order that a definite list may be prepared in the month of May for circulation.

The Geographical Exhibition will be classed in the same Sections as the Congress. The scope of each is shown in the following description of the objects proposed to be included.

Class 1.—Instruments of practical geometry. Apparatus and instruments of topography, geodesy, and astronomy. Telemeters, and instruments for measuring velocity. Tables of projection and calculation. Maps exhibiting the various systems of projection. Sidereal maps; maps of triangulation, and hypsometry. Original topographical charts. Publications relating to the measurement of the earth. Photographical apparatus.

Class 2.—Instruments, portable and of precision, relating to hydrography. Reflectors. Chronometers, marine and pocket. Logs, leads, dredges; apparatus for deep-sea sounding; thermometers for measuring the temperature at different depths; instruments for measuring tides and currents; compasses and other nautical instruments (instruments for reduction, parallel and other rulers, &c.).

Marine charts, general, coasting, and special; plans of harbours and anchorages. Views of coasts. Maps of currents, winds, and tides. Tables and Ephemerides for the use of astronomers and mariners. Publications relating to hydrography and maritime geography. Guides to navigation; catalogues of lighthouses, beacons, &c. Proposals for a uniform international system of buoys and beacons, and for completing the lighting of the coasts. Laying of submarine lines of telegraph.

Class 3.—Instruments for observing meteorological phenomena. Maps, atlases, globes representing facts relating to the dominion of physical geography and meteorology. Magnetical charts (isoclinous, isogonous, and isodynamic). Charts of isobars and isotherms, &c. Maps of geological, zoological, and botanical geography. Other publications and collections relative to this branch.

Class 4.—Maps and atlases referring to general anthropology, ethnology, and comparative philology. Other publications and collections relating to these subjects. Grammars and vocabularies of languages little known; comparative studies.

Class 5.—Maps and other publications of historical geography. Ancient and modern works and manuscripts relating to the history of geography. Ancient maps and globes. Instruments used by ancient geographers; astrolabes, &c.

Class 6.—Works, charts, and diagrams of statistical, economic, and commercial geography (population, agriculture, manufactures, commerce, public works, colonisation, &c.). Collections of commercial products and objects made from a geographical point of view.

Class 7.—Treatises and methods for instruction in geography. Outlines and landscapes. Wall maps; models and instruments for instruction in geography. Atlases and geographical dictionaries. Charts and maps of the globe, terrestrial and celestial; globes. Copies of topographical charts; maps and plans in relief. Different methods of reproducing maps (photography, heliotypy, lithography, zincography, photolithography, chromolithography, &c.). Materials and apparatus specially used in the preparation of maps.

Class 8.—Instruments for expeditions, astronomical determinations, and topographical copies; travelling barometers and thermometers, pedometers, sextants, &c. Portable photographic apparatus; specimens of camera lucida. Route-maps; sketch maps. Essays, facsimiles, reproductions, and collections of every description which illustrate voyages of discovery; photographic views and drawings of countries little explored. Instructions for geographical expeditions. Instruments and equipment of a traveller; portable arms, utensils, tents, and medicines; portable boats; waterproof coverings and clothing; apparatus for giving light on nocturnal marches and encampments. Modes of packing and carrying on voyages of discovery. Narratives and publications of all kinds relating to geographical voyages. Publications and instruments used in Alpine climbing.

Scientific Instruction for Intending Travellers.— Mr. Coles, the Instructor under the system of training in the use of instruments, mapping, &c., established by the Council of the Society in 1879, has given in the following Report of his operations between the 13th October, 1879, and 31st December, 1880:—

"I commenced giving instruction on the 13th October, 1879, since which date I have given 232 lessons to twenty-four gentlemen. The subjects taught embrace nearly all the problems in practical astronomy and surveying, while instruction in the actual use of the transit-theodolite—ordinary 5-inch theodolite—sextant and artificial horizon has been given (in the country, in the case of surveying), and at night in the Society's observatory; the use of the mercurial barometer, and hypsometrical apparatus, as a means of finding the difference of height between two stations has been taught, together with the manner of plotting a traverse survey by means of the prismatic compass, and map construction.—The following is a summary statement of the progress made by the pupils, and their destinations:—

"Of the twenty-four gentlemen who have been under instruction, thirteen made excellent progress and eight others received a fair training. The destinations of twenty-two of them, after leaving me, were as follows:—To Sofala, 1; River Congo, 1; River Shiré, 1; Zulu-land, 1; Central Asia and Afghanistan, 2; Kurdistan, 1; Singapore, 1; Borneo, 1; India and Munipoor, 2; Ceylon, 1; New Guinea, 1; China, 5; North America, 1; South America, 2; and Iceland, 1.

"A large proportion of the instruction has of necessity been given at night, after the Society's building has been closed to the public, and in some instances I have given instruction in the morning before office hours. Advantage has been taken of the verbal instructions which I received from the Committee to give practical instruction in route surveying in the country; but when this class of instruction has been given, it has most frequently been in the summer evenings, and on some few occasions after 3 o'clock in the afternoon, when there was nothing special to require my presence in the map room. I have not found that the time devoted to instruction—i. e. from 3 to 5 P.M.—has in any way prevented my giving the necessary attention to the inquiries of visitors, as I am always able to leave my pupils for a short time, if required to do so. I am not aware that I can suggest anything that would improve the present system of instruction, which has been found to give satisfaction, and to work well; and I have, indeed, nothing to request, except that I may be confirmed in the appointment which I have now held provisionally for more than eighteen months, and also that the provisional arrangements with reference to the hours to be devoted to instruction, and the fees may also be confirmed.—As instructed, I have obtained offers to give instruction in photography from some of the leading photographers, together with their terms, which I annex.—JOHN COLES, Instructor in Practical Astronomy and Surveying, R.G.S."

In consequence of the satisfactory nature of the above Report, and the further increase in the number of pupils since the end of the year, the Council have decided to place their system of instruction on a more permanent footing, it having been hitherto carried on only as an experiment and under provisional arrangements. Mr. Coles' appointment has therefore been confirmed, and he is to be designated henceforward as "Instructor in Practical Astronomy and Surveying to the Royal Geographical Society."

The Society's Fifty Years' Work.—The approaching issue of the fiftieth volume of the Society's Journal will be signalised by the publication of a memoir reviewing the fifty years' work of the Society, from the pen of Mr. C. R. Markham. It will form part of the volume, and also be printed separately in a limited number of copies. The memoir will commence with an account of the foundation of the Society in 1830, and give in successive chapters details of its connection with all the numerous expeditions, national and private, which have been undertaken since that date; lists of its Presidents, Councils, and Officers, chief geographical memoirs and maps, and other records.

Obituary.

Captain T. L. Phipson-Wybrants.—It is with sincere regret that we have this month to record the death of Captain Temple Phipson-Wybrants, one of the most accomplished and promising of recent essayists in the field of African travel. It was only in July last that he started from England at the head of an expedition, admirably organised and fitted out, for the purpose of exploring the almost unknown tract lying between the Zambesi and Limpopo rivers. Accompanied by four Europeans and about a hundred picked natives under the well-known Chuma, he had but just commenced his labours when he was unhappily struck down, as we learn from private telegrams, by fever, together with two of his companions, Dr. Ward Carr, and Mr. Mears, a faithful attendant.

Captain Wybrants, who had only recently completed his thirty-fourth year, became a member of the Society in 1879. He had retired from the Army some years previously, having obtained his company in the 75th Regiment, with which he had served successively at Gibraltar, Mauritius, and in South Africa. He had travelled extensively, and while at the last-named station was enabled to gratify his favourite pursuit by making frequent excursions into the interior. In 1874 he was selected to accompany the Hon. Chas. Brownlee upon a political mission of some importance, despatched by the Colonial Government to the powerful Kafir chief, Kreli. On his return, he contributed to the 'Cape Monthly Magazine' a series of papers on the condition of Kaffraria and its inhabitants, with an account of the various chiefs and tribes with which he came in contact; a description that was so highly thought of, that it was afterwards published in a separate and permanent form. He was a constant contributor to Colonial and English periodicals on South African affairs, in which, both by travel and thought, he was intimately versed; and we understand that, before leaving the colony, he was offered by the Colonial Government a post of considerable distinction and importance. Africa had indeed a never-failing, although, as it has unhappily proved, a sinister charm and interest for him.

In undertaking the management and leadership of his recent expedition, Captain Wybrants spared neither labour nor preparation to render himself thoroughly competent for the post. That his work might be as valuable as possible from a geographical standpoint, he placed himself under the tuition of the Society's Instructor in Surveying and Practical Astronomy, Mr. John Coles, and in a short space of time made extraordinary progress in taking and computing astronomical observations. So devoted was he to this branch of his labours, that he frequently spent whole nights in its pursuit, taking on one occasion nearly eighty distinct sets of observations. The report made to the Council of his proficiency in this respect was so high that the Society granted him a very valuable set of scientific instruments for use on the expedition. Our President, Lord Aberdare, also obtained for him through Earl Granville, H.M. Secretary of State for Foreign Affairs, the good offices of the Portuguese Colonial Authorities at Mozambique, and of Dr. Kirk, H.M. Consul-General at Zanzibar. In order further to facilitate river navigation and the transport of stores and baggage in the interior, he had specially constructed for the purpose, in London, a steam-launch, cut into easily portable sections, and this little craft he speedily learnt to manage and regulate with perfect skill and ease.

The expedition, through various vexatious delays and the difficulty of obtaining transit down the coast from Mozambique, had unfortunately been detained until a dangerously late period of the tropical year, and this cause, we much fear, must have materially contributed to the disaster that overtook the party. Although starting from England, overland, the first week in July 1880, it was nearly four months before Captain Wybrants reached the mouth of the Sabi river, near Sofala. Here, at Chiluan, we are gratified to learn that his party experienced the greatest hospitality and attention from the Governor, Senhor Fornasini, a kindness to which Captain Wybrants bears warm testimony, and which he attributes to the cordial personal letters with which he was furnished by the Viscomte Duprat, Portuguese Consul-General in London. From this locality Captain Wybrants had already sent home several observations of value, including the determination of the position of Chiluan itself, hitherto inaccurately laid down in the Admiralty charts, and the discovery of the true mouth of the Sabi river, which he found to be situated not north of Chiluan, as marked in the charts, but some distance south of that place at a point hitherto known as Mozomone Bay. The last letter written by any member of the party was one sent by Captain Wybrants to his mother, from which we have been permitted to make the following extract as having a general interest:—

"MACHANGA, 30 miles up the Sabi river,
October 21*st*, 1880.

. . . . "I have a chance of sending you a line from this place, at which I arrived this morning early. I started off the men (natives) with Owen, Carr, and Mears, the day before yesterday to go round by sea, whilst Mayes and I left in the steam-launch an hour or two later. We travelled by a river that had more windings and twists than I ever thought a river capable of, called the Inyanbirwe, and made our first halt at 6.30 P.M. We left again yesterday morning at 2.30 A.M. and halted for lunch at 12, waited for the tide (being a tidal river), and pushed on at 3. I took observations. We landed to sleep on the Macon, the opening to the Sabi from the sea, and started again at 4 A.M. to catch the tide, arriving here at 9 A.M. The rains are fortunately late this year, and although there has been such delay, yet I am delighted to say we shall be able to get to Umzila's before they set in. His great kraal is about 100 miles from here, which will not take more than twelve days' journey. I interviewed a big chief here to-day and had a big *palaver*. I am in capital health, and fortunate in being able to write from so far up country. The man is waiting to take this who piloted us up the river. It was the strangest feeling I think I ever knew, travelling through dark mangrove swamps with the moon every now and then glinting through the thick foliage which hung down so far that we had to take down the funnel of the launch. We were stuck for an hour in one place, the river being only six feet wide (tide out) and the boat could not turn. It was very weird, for the oozing of the black mud was the only sound heard. Not a living creature can exist in these swamps of the Sabi delta. Mayes and I were the only white men—the pilot (a Hindi) and our three boatmen the others. We drank hot tea, which was very refreshing. It was a curious adventure, and I enjoyed it for its strangeness. . . . . Carr is better, and Owen all right."

We gather from the brief telegrams received, for there has not been time yet for the receipt of detailed news, that Captain Wybrants' death occurred some time in the month of February. On the 22nd of that month, Mr. O'Neill, H.M. Consul at Mozambique, telegraphed the sad tidings to Earl Granville, requesting at the same time that a cruiser might be sent to Chiluan to the relief of the party thus left without its leader. Earl Granville thereupon promptly communicated with the Admiralty and with our Minister at Lisbon on the subject, with the result that the Portuguese Government at once sent out instructions to the Governor-General of Mozambique to send a steamer with assistance, and a British cruiser, the *Wild Swan*, was despatched on a like errand. The Portuguese corvette, *Rainha de Portugal*, left Mozambique on the errand of mercy on the 1st of March.

By the untimely death of Captain Wybrants the cause of exploration has lost an able and zealous follower; and we can well realise how bitter must have been his disappointment as he felt his hold relaxing on those objects which he had so keenly at heart. It is sincerely to be deplored that a career of such brightness and promise should have been thus early cut short, for it is certain that had Captain Wybrants lived, his name would have taken no insignificant rank among the heroes of African travel.

Mr. James Tennant.—We have to record the death, in London, on February 23rd, of Mr. James Tennant, Mineralogist to the Queen, at the age of seventy-three. Mr. Tennant came to London at an early age, and was employed by Mr. Mawe, who was in the habit of bringing to England, after his various journeys, large quantities of shells and minerals. He thus acquired the taste for mineralogy in connection with which his name has become so well known as a teacher and collector. Mr. Tennant eventually succeeded to Mr. Mawe's business, and carried it on successfully up to the time of his death. His mineralogical collections were probably the best existing in the possession of a single individual, and he was looked upon as an especially good authority on the subject of gems and precious stones generally. We learn from the *Illustrated London News* that in the course of his lectures, Mr. Tennant had frequently spoken of the probability of diamonds being found in South Africa, basing his views on some similarity between its gravels and those of Brazil, and that an accidental leaflet, published for the use of his class, containing diagrams of the various crystalline forms of diamonds, enabled Dr. Atherton, of Cape Colony, to verify as a diamond the first pebble picked up by a traveller in the Transvaal, and which was suspected to be a diamond; the result being that the locality was thoroughly explored, and that up to the present time diamonds to the value of some 23,000,000*l.* sterling have reached Europe from those diamond-fields. When King's College, London, was first opened, Mr. Tennant, on the recommendation of Professor Faraday, was appointed teacher, and afterwards professor of mineralogy, an office which he held up to the time of his death. He was also for some years professor of geology at the same College, and teacher of geology and mineralogy at the Royal Military Academy, Woolwich. He compiled a number of catalogues and memoirs on matters connected with his business, including a stratigraphical list of British fossils; and in conjunction with Professor Ansted and the Rev. W. Mitchell, he prepared the treatise on geology, mineralogy, and crystallography for Orr's 'Circle of the Sciences.' Mr. Tennant, who was a Fellow of the Geological, Chemical, and other Societies, was elected a Fellow of our Society in 1857, and was a very constant attendant at our Evening Meetings; he also, on several occasions, acted as one of the Scrutineers at our Anniversary Meetings.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Seventh Meeting, 28*th February*, 1881.—The Right Hon. Lord ABERDARE, President, in the Chair.

PRESENTATION.—*Rev. Chas. E. B. Reed*, M.A.

ELECTIONS.—*Percy W. Ames, Esq.; Henry Robert Baillie, Esq.; Arthur Copinger, Esq.; Arthur Greenwood, Esq.; Richard A. Ivens, Esq.; Thomas Ruddiman Johnston, Esq.; Gabriel James Morrison, Esq.; The Earl of Rosebery; Edwin Williams, Esq.; Ralph Williams, Esq.; Samuel H. Whitbread, Esq.*

The subject of the evening was a lecture by Sir Richard Temple, Bart., G.C.S.I., entitled

"The Lake Region of Sikkim, on the Frontier of Tibet."

The lecture was illustrated by a series of coloured drawings, on an enlarged scale, representing the localities described, by Lieut. G. T. Temple, R.N., and by a map of Sikkim.

The lecture, illustrated by engravings, reduced from the drawings above mentioned, and a map, will be published in a subsequent number of the 'Proceedings.'

Eighth Meeting, 14*th March*, 1881.—Sir RUTHERFORD ALCOCK, K.C.B., Vice-President, in the Chair.

PRESENTATIONS.—*Lieut. F. T. N. Spratt*, R.E.; *R. C. Williams, Esq.*

ELECTION.—HONORARY MEMBER, HIS IMPERIAL HIGHNESS THE ARCHDUKE LUDWIG SALVATOR OF AUSTRIA.

FELLOWS.—*William M. Crocker, Esq.; Maurice Des Graz, Esq.; Walter Kirkland, Esq.; John Moore Milthorp, Esq.; Rev. William Pace Rigg.*

The following paper was read:—

"Lake Nyassa, and the Water Route to the Lake Region of Africa." By James Stewart, C.E. (Will be published in the May number of the 'Proceedings.')

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—March 4th, 1881: M. Daubrée, of the Institute, in the Chair.—M. Dutreuil de Rhins communicated the results of the investigations which he had made to determine the geographical position of the village of Nabchu, where Colonel Prejevalsky was obliged to stop, and retrace his steps, when only about 180 miles from the capital of Tibet. M. Dutreuil de Rhins, identifying this locality with the "Na ptchu" mentioned in the account of Abbé Huc's journey ("Nagh tchou" on Klaproth's map), and by utilising the labours of the Jesuits or rather of the Lamas, and working out the Chinese itineraries in Tibet, places the locality in 31° 8′ N. lat., 88° 50° long. east of Paris; while the original works of the Lamas, as interpreted by the Jesuits and d'Anville, give 32° 10′ lat., 89° 30′ long. east of Paris, the position given on Abbé Huc's map, and Klaproth places the village in 32° 15′ lat., 89° 54′ long. east of Paris.—The difference of opinion between M. Romanet du Caillaud and Dr. J. Harmand on the subject of the affinities and differences between the Annamites and the savages of Tongking was referred to again, and the position assumed by the latter was supported by Dr. Hamy, who said that he had arrived at the same conclusions in the course of the researches he had made regarding the races of Indo-China for the work he was engaged upon in conjunction with M. de Quatrefages ('Crania Ethnica, &c.').—The General Secretary gave some news of Colonel Flatters' expedition, and read a telegram, dated Jelfa, February 28th, from M. Tarry to M. de Lesseps, stating that Colonel Flatters was traversing the Sebkha d'Amaghdor on January 30th, and directing his course toward Assiu, and that he was on friendly terms with Itahren who had sent him his kinsman as well as guides.—M. Duveyrier made some explanatory observations on the Sebkha d'Amaghdor and the important part which it plays in the relations between the populations of the Sahara and the Sudan.—Dr. Harmand read extracts from a letter which he had just received from Dr. Neis, on his return to Saigon from a journey through the forests on the north-east frontier of the French possessions.—Dr. Neis started on November 4th from the frontier post of Baria, and ascended the western branch of the Dong-nai to its source. Crossing a plateau, which it took him seven days to traverse, Dr. Neis was able to ascertain the position of the eastern branch of this large river, which is much longer than the other, though it is not navigable; but he could not follow its course on account of the savage condition of the inhabitants. Dr. Neis then travelled in an easterly direction to the capital of the Annamite province of Bing-thuan, and embarking at the port of Phang-ry, reached Saigon on January 8th. In this letter he furnishes details respecting the peoples visited, whom he studied from an anthropological point of view, and he announces the early publication of the results of this exploration among the works which are being issued by the Governor of Cochin-China under the title of 'Excursions et Reconnaissances en Cochinchine.'—Comte Meyners d'Estrey read a paper on the Boers and the Basutos, in which, after some general remarks on the subject of European colonisation in South Africa, he described the physical features and the principal productions of the regions inhabited by them.—Dr. Bayol afterwards communicated to the Meeting the information collected by Captain Gallieni's expedition respecting the country between the Senegal and the Niger, which will be published in the Bulletin of the Society.

——— March 18th, 1881: M. Daubrée, of the Institute, in the Chair.—The Chairman spoke in terms of high encomium of two distinguished members whom the Society had just lost,—the Abbé Durand, who had been for five years their

Librarian, and M. Eugène Cortambert, the well-known geographer and author of widely used elementary works, who had taken a very active part for forty-five years in the labours of the Society. The Secretary General announced that the Gold Medal, founded by the late M. Erhard, had been awarded to M. Villemin, the cartographer.—M. Lejanne, Dr. Crevaux' companion in South America, gave some details respecting the itinerary of the expedition. Setting out from St. Nazaire on August 6th, 1880, they arrived at Savanilla on the 26th, and ascending the Magdalena in a steamer, reached Neira on October 3rd. On the 20th they came to the Guyabero,* an affluent of the Orinoco, and spent five days in the construction of rafts, on which they descended the river for 1275 miles; the country traversed for 375 miles of that distance being entirely desert. On reaching San Fernando de Atabapo, Dr. Crevaux engaged some Indians to take him to Ciudad Bolivar, in Venezuela, whence the expedition went by steamer to Trinidad. Dr. Crevaux remained there, and made arrangements for a visit to the native villages in the delta of the Orinoco. A letter, dated Port of Spain, February 27th, announced that he had returned with interesting anthropological information, but that, owing to an attack of fever, he had been unable to return to Europe by the mail-steamer.—M. Henri Duveyrier read two letters giving news of Colonel Flatters' expedition in the Sahara. The first of these was written by Colonel Flatters himself from Inrhelman-Tikhsin (lat. 25° 30′), under date of January 29th. After informing M. Duveyrier how extremely useful and accurate he had found his map, he says it will be necessary to make Amguid, Aghellâchchem, and Amadghôr a little lower on that map, and to make the granitic and volcanic chain of Eguéré a more marked feature. The expedition travelled by Wâd-Miya, Hâssi-Inifel, and the Tâdemayt plateau; and making a bend towards El Messeguem, and another to the east and the south-east towards Irawen, they reached Inrhelman-Tikhsin, to the south of the Eguéré chain, near the Sebkha d'Amadghôr where they expected to arrive in three days. Thence they were to push on direct to Assiu, paying a visit, if possible, to Idelès. The Ahaggars had received them well, and furnished them with guides. Colonel Flatters hoped to reach Assiu in twenty-five days, and beyond that point he would act according to circumstances in moving on to Haussa without delay, though possibly he would march from Assiu to Agadez by Dr. Barth's route. But once at Assiu, he says, the question of the Trans-Sahara railway may be considered as settled, though he is determined to press on as fast as possible to the Sudan; if the Kêl-Owi will not allow him to pass, he will try another route, or return by way of Rhât. The second letter was from M. Beringer, dated January 26th, and gives some further details respecting the route hitherto followed by the expedition.—Dr. Bayol, formerly a member of Captain Gallieni's expedition to the Niger, announced that he had just received instructions to visit the Bambuk, Mandingo, Buré countries, and the Futa-Jallon highlands in West Africa. He is to study the country and the town of Timbo, an important commercial centre for the whole of that region. He will be accompanied by M. Billet and a photographer, and leave Bordeaux on April 5th.—M. de Ujfalvy, who had just returned from Central Asia, having been unable from political causes to carry out the northern route he had proposed, stated that he was about to start again on the following day. He proposes to adopt the southern route, and starting from Odessa, to travel by way of Tiflis, Baku, the Caspian, and Khorassan. He will be accompanied, as before, by Mme. de Ujfalvy. M. de Ujfalvy gave the Meeting numerous particulars respecting the anthropological peculiarities which distinguish the Kirghizes, Bashkars, and Tajiks, illustrating his remarks by a series of photographs.

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* See *ante*, p. 111.

Geographical Society of Lyons.—March 6th, 1881.—After some introductory observations by the President, M. Augustin Seguin read a paper on his journey in America and his visit to the sources of the Missouri in the Rocky Mountains. M. Seguin's paper will be published *in extenso* in an early number of the Bulletin of the Society.

Geographical Society of Berlin.—March 5th, 1881: Dr. NACHTIGAL, President, in the Chair.—At the conclusion of the ordinary business, the President announced to the Meeting that Dr. Oscar Lenz, whose return had been expected almost immediately, had gone back from Bordeaux to Tangier, in order to settle the claims of the Arab members of his expedition, who are residing there, and to superintend the transfer of his collections to Germany. He would return to Berlin probably before the end of March.—Several letters had come to hand from Dr. E. Junker, who at the commencement of last year undertook at his own expense a second voyage to Africa, for the purpose of exploring those portions of Central Africa first made known to us by the travels of Dr. Schweinfurth. The most recent of these letters was dated from the Monbuttu country, September 1st, 1880. After a lengthened sojourn at Meschera-el-Rek, on the banks of the Bahr-el-Ghazal, Dr. Junker had penetrated in a south-west direction through the land of the Bongo- or Dohr-negroes into the territory of the Niam Niam, by the inhabitants of which, falsely described as anthropophagi, he was received in the most hospitable manner. In the settlement of the Chief Ndoruma he built himself a hut supplied with every comfort, and here, in the enjoyment of perfect repose, he worked out the reports of his journey, which have already reached home. Thence, in the month of August, he proceeded in a south-west direction into the territory of Pulembata, and afterwards in a S.S.E. direction into the country of the Monbuttu. His letter of the 1st of September above mentioned was dated from the limits of the territory of the Mangballa, a day's journey north of the Uëlle. The traveller proposes to cross the Uëlle and to visit the Mombanga, a tribe of Monbuttu, and finally to penetrate in a north-west direction amongst the A-Madi. All these territories are as yet unexplored, as they are situated to the westward of Dr. Schweinfurth's track, and there was reason to hope that the traveller, whose state of health was perfect, would successfully carry out his intentions.—Dr. Riebeck, who in the autumn of last year had set out at his own expense on a scientific voyage round the world, had forwarded a description of an excursion he had made round the shores of the Dead Sea, which would shortly be published in the Journal of the Berlin Geographical Society. On the return his companion, Dr. Mook, was unfortunately drowned in the rapid waters of the Jordan, whereupon Dr. Riebeck started with his second travelling companion for Egypt. Here, in the society of Dr. Schweinfurth, he made a twelve days' journey into the Arabian Desert, and now intends to join the latter in a voyage of exploration to the island of Socotra.—The Chairman, having alluded to the latest received letters from Australia, announcing the recovery of the journals of the German traveller, Dr. Leichhardt, who disappeared in the then unknown interior more than thirty years ago, next communicated to the Meeting the contents of a circular addressed by the President of the Geographical Society of Bremen to the various German Geographical Associations, asking contributions from all persons interested in Polar research for the support of an exploring expedition to the Tchuktche Peninsula (Northern Siberia). It was proposed for the present to send out a young savant well versed in natural history and geographical science. In the interest of an active participation of Germany in Polar exploration, the President said it was desirable that this project should be carried out, the more so, as the establishment of meteorological stations in the far north, as proposed by the International Conference on Polar research, had not met with much encouragement within the limits of the German empire. On this account, he, the President, had considered it his duty to submit to the Imperial Chancellor a more comprehensive memorial, explaining the importance and usefulness of these stations.—Dr. Beheim-Schwarzbach next addressed the Meeting on the subject of the Maoris of New Zealand, relating his own personal experiences, and finally, Dr. Schwalbe read a paper on ice-caves and abnormal ice-formations.

Geographical Society of Cairo.—January 28th, 1881: General STONE-PACHA, President, in the Chair.—Mr. J. Piétri gave a *résumé* of the first part of the report by MM. Zweifel and Moustier on their discovery of the sources of the Niger.—Mr. A. Washington addressed the Society on the subject of a work, entitled 'Abissinia,' by Signor Pippo Vigoni, of Milan, who was a member of the first expedition despatched by the Committee for the Commercial Exploration of Africa.—M. Zimmermann, French Administrator of Egyptian Railways, afterwards gave a sketch of the life and labours of the late Mariette-Pacha, honorary member of the Society.—At the same meeting our Associate, Major-General Sir F. J. Goldsmid, K.C.S.I., C.B., was elected a member of the Society.

Geographical Society of Quebec.—Annual General Meeting, January 24th, 1881: Dr. H. H. MILES, President, in the Chair.—The President opened the meeting by briefly recounting the work of the past year, and by presenting a summary statement of the Society's affairs, the condition of which was, on the whole, satisfactory. Geographical works, as well as maps and charts, had been added to the Society's collection, which with the publications received from various Geographical Societies had enabled the Council to form the nucleus of a library. Attention was called to the contents of the published Transactions, especially to the papers read last winter, contributed by Mr. Benjamin Sulte, of Ottawa, on the progress of exploration from Newfoundland to the Rocky Mountains; by Dr. R. Bell, on recent explorations round Hudson's Bay, and by Count de Premio Real, Spanish Consul, on the Isles of St. Pierre and Miquelon, the last two of which are illustrated by small maps.—It was announced that the course of papers for the present winter would probably commence about the middle of February, and that those which would be brought forward would be of considerable interest. It was further stated that the Council intended to publish Transactions from time to time, and by thus diffusing geographical information regarding all parts of the Dominion of Canada, to carry out the objects for which the Society was founded a short time back, viz.:—(i.) To popularise and extend the study of geographical science, and of all the pursuits subsidiary to its advancement; (ii.) To study and make known the country in relation to its productive forces, and especially to bring forward its agricultural, forest, maritime, mineral, industrial, and commercial resources, with a view to augment its richness and the well-being of its population; (iii.) To study the means of fresh-water, maritime, and land communication, and those of other countries, with a view to facilitate and extend commercial relations; (iv.) To prosecute every kind of scientific study comprehended in geographical science, and which may enlarge the general knowledge of the earth, and of the forms, structures, and relations of terrestrial objects and agencies; (v.) To open communication with the Geographical Societies of other countries, in order to profit by their researches and their labours, and to secure their co-operation in the work of the Society.—Another application is to be made during the present session to the Legislature for a moderate grant to assist the Society in carrying on its work, which is for the benefit of all the provinces of the Dominion. The example of the great Geographical Societies of the world, and their vast and acknowledged utility and influence in their respective countries, were cited as furnishing an idea of what a similar organisation might be expected to contribute for the common benefit of Canada.—The following were elected officers of the Society for the present year:—President, Dr. H. H. Miles; Vice-Presidents, T. Ledroit, E. T. Fletcher, and S. Lesage; Treasurer, L. P. Sirois; Secretaries,—Recording, C. Lindsay; Assistant ditto, Jos. Fremont; French Correspondent, J. J. B. H. Chouinard; Assistant ditto, N. Levasseur; English Correspondent, W. C. Seaton; Assistant ditto, G. W. Colfer; Librarian, P. de Cazes; Additional Members of Council, Hon. P. Fortin, Hon. G. Guimet, Hon. H. G. Joly, F. Tims, and Dr. F. Dionne.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Oesterley, Hermann.—Historisch-geographisches Wörterbuch des deutschen Mittelalters. Gotha (Perthes): 1881, sm. 4to. (*Dulau.*)

This is the first part of a proposed Historico-geographical Dictionary of Germany in the Middle Ages, intended to be completed in 1882, at a cost of about 1*l.* 10*s.* The present number includes from A to Borengum.

ASIA.

Baness, J. Frederick.—Index Geographicus Indicus, being a list, alphabetically arranged, of the principal places in Her Imperial Majesty's Indian Empire, with notes and statements, Statistical, Political, and Descriptive, of the several Provinces and Administrations of the Empire, the Native States, independent and feudatory, attached to, and in political relationship with each; and other information relating to India and the East. Calcutta (Newman) and London (Stanford): 1881, large 8vo., pp. 201 and cxii.

The very full title above given sufficiently indicates the scope of the work, for which the position of its compiler as surveyor and chief draughtsman in the Geographical Branch of the Survey of India has well fitted him. As a handy book of reference, both here and in India, this index, the first of its kind relating to modern Indian geography, will be found of much practical convenience, compressing as it does in a single handy volume the chief geographical, political, and statistical points of our vast Indian Empire, for which search has hitherto had to be made in the old general gazetteer of Thornton, or the more modern separate official works of a similar nature referring to some of the provinces. The long list of closely printed names in double column at the end of the book, each with brief reference to its district and province, is itself practically a modern gazetteer of India.

The following maps are given:—Punjab, North-Western Provinces and Oudh, Bengal Lower Provinces and Assam, Central Provinces, British Burma, Rajputana and Central India Agencies, the Madras Presidency with Mysore, Coorg, and Ceylon, and the Bombay Presidency, all on the scale of 64 miles to the inch. These are on the base of the map of India from the Surveyor-General's Department, dated 1877, with omission of hill work and addition of many names of places and railroads. The names are spelt differently in most cases from those on that map, and are apparently in accordance with recent authorised orthography,—if so, being the first so given by any writer in an official position.

In addition to the particulars referring to British India, the work contains a general description of outlying independent States, &c., a glossary of Indian territorial designations, and a sketch of the peoples and religions of India.

No price is given for this work, which it is believed will be issued at about 1*l.* 1*s.*

British Burma.—The British Burma Gazetteer. Compiled by authority. Rangoon (Government Press): 2 vols., large 8vo., Vol. I. (1880) pp. x., 716, xxxv., Vol. II. (1879) pp. 859, xviii., photographs.

This valuable compilation by Mr. H. R. Spearman is based upon various published official Reports and acknowledged authorities of the highest standing. The system of transliteration followed is (with the exception of a persistent error duly noted) that of Colonel Browne, which is followed in obedience to orders of the local Government. It is elucidated by an introductory table of recognised permutations.

The first volume (the later in date) contains accounts of the physical geography, geology, and economic mineralogy, forest and other vegetation, ethnology, religion, history, both national (divided into six periods) and administrative, manners and customs, arts, manufactures, agriculture, &c., population, revenue, and trade, and zoology (the larger groups of animals being separately discussed). A good index is given.

Vol. II., which is quite distinct, is on the usual gazetteer scheme, though considerably extended in treatment (e. g. the article "Ka-reng" occupies 17 pages, full of interesting ethnological matter).

The photographs represent various scenes of archæological and general interest; and the work is likely to remain of permanent value for referential purposes.

Imbault-Huart, Camille.—Recueil de Documents sur l'Asie Centrale. Paris (Leroux): 1881, 8vo., pp. 225, maps. (*Williams & Norgate:* price 12*s.* 6*d.*)

This forms vol. xvi. of the Publications de l'École des Langues Orientales vivantes, and contains: I. Histoire de l'insurrection des Tounganes sous le règne de Tao-kouang̃ (1820–1828), d'après les documents Chinois; II. Description orographique du Turkestan Chinois, traduite du Si Yu T'Ou Tché; III. Notices géographiques et historiques sur les peuples de l'Asie Centrale, traduite du Si Yu T'Ou Tché.

The author is attaché at the French Consulate, Shanghai. The maps are of Chinese Turkistan, translated from the work "Si Yu T'Ou Tché" mentioned in the Contents above given; this means "Historical and geographical description of Central Asia," and is apparently of great rarity even in China. A notice of it is given in an Appendix, from a copy purchased at a sale in Paris.

Murray's Handbook of the Bombay Presidency; with an account of Bombay City. 2nd edition. London (Murray): 1881, crown 8vo., pp. 405, maps, plans. Price 15*s.*

Mr. E. B. Eastwick, who in 1879 undertook the revision of the Madras portion of Murray's 'India,' has here also so completely rewritten the 1859 issue of the Bombay part as to make it a new book rather than a fresh edition. The great changes in the country during the past twenty-one years have rendered it necessary for the author to visit the most important places, and in particular Káthiawáḍ. The historical part, vocabularies, &c., are now put together at the beginning of the volume.

AFRICA.

Pigafetta, Filippo.—A Report of the Kingdom of Congo, and of the Surrounding Countries; drawn out of the Writings and Discourses of the Portuguese, Duarte Lopez, by Filippo Pigafetta, in Rome, 1591. Newly Translated from the Italian, and Edited, with Explanatory Notes, by Margarite Hutchinson. With Facsimiles of the Original Maps, and a Preface by Sir Thomas Fowell Buxton, Bart., F.R.G.S., &c. London (Murray): 1881, 8vo., pp. 174, maps. Price 10*s.* 6*d.*

Mrs. Hutchinson, during the preparation of a treatise on Africa by her husband, Mr. E. Hutchinson, Secretary of the Church Missionary Society, found it necessary to study the work of Pigafetta in our Library; and, finding that the translation in 1597 by Hartwell is practically as inaccessible as the original, on account of its rarity, has earned the best thanks of English geographers by re-translating the account of the Central African travels of Lopez, commencing in 1578. This is rendered more complete by some excellent illustrative notes; a quotation from Cordeiro's African Hydrography on the map of Duarte Lopez; a paper on the Cartography of Africa from 1492 to 1600, as illustrative of the nomenclature of the Congo, with table and notes, by Mr. C. H. Coote, of the British Museum; and a bibliographical note on the 16th century editions of Pigafetta.

The maps are reduced reproductions by photo-zincography of the large map of Africa and the kingdom of Congo, both of which are not always found in the same copy of the original. The plates are not reproduced.

Rohlfs, Gerhard.—Neue Beiträge zur Entdeckung und Erforschung Africa's. Cassel (Fischer): 1881, 8vo., pp. 156. (*Williams and Norgate:* price 3s.)

Scattered notes on Mohammed Gatroni, the "Chuma" of most recent German African travellers; the importance of Tripoli in the problem of opening up Africa; the increasing value of Halfa grass (*Macrochloa tenacissima*, the Spanish "Atocha") for European trade purposes; the Sahara and its phenomena; inland seas in North Africa; embassies to and from Morocco; Tekna and Nun; the Djofra Oasis in 1879; and the empty river-bed of the so-called "Bihâr bilâ-mâ."

AMERICA.

Chile.—Anuario Hidrografico de la Marina de Chile. Año vi. Santiago (Imprenta Nacional): 1880, large 8vo., pp. 564, maps.

Captain Vidal Gormaz has, in spite of the exceptional circumstances of the past year, obtained sufficient material from his fellow scientific naval officers to fill a considerable volume, besides publishing smaller treatises which have from time to time been noticed in our 'Proceedings.' The present issue contains:—(1) Accounts of explorations in the Straits of Western Patagonia by Captain Oscar Viel in the *Chacabuco*, early in 1879, with some notes on geology, climatology, zoology, and botany by Pedro V. O'Ryan; this part is illustrated by 7 maps with soundings, of various detailed portions of the survey, which was chiefly near Rennel and Farquhar islands, and the adjoining straits and passages. (2) The diaries of Captain Latorre and his sub-officers during their exploration of Skyring Water in the *Magellanes*, with particulars of other excursions in Southern Patagonia, especially of one under Lieutenant Serrano to the main island of Tierra del Fuego, which supplied material for a report by Dr. Philippi on the zoological objects found (including a new *Ctenomys*). A map of the northern portion of Tierra del Fuego accompanies this.

The remainder of the volume is purely hydrographic, or of professional interest, except Part VII., which consists of a continuation by Ramon Guerrero Vergara of the account of the discoverers of the Straits of Magallanes, commenced in vol. v. of the 'Anuario.' This part includes from Francisco de Ulloa, 1553, to Peter Curder, 1578, and is also published separately at Santiago (8vo., pp. 140), with a map showing the voyage of Juan Ladrillero, 1557 and 1558.

Lista, Ramon.—Mis Exploraciones y Descubrimientos en La Patagonia, 1877–1880. Buenos Aires (Biedma): 1880, large 8vo., pp. 213, pls., maps.

A more detailed and amended account of the author's journeys in Patagonia, of which a notice appeared in our 'Proceedings' for 1879, p. 479. The little lake near the head waters of the Rio Chico is now named Moyano.

S. W. Silver & Co.'s Handbook to Canada. London (Silver): 1881, cr. 8vo., pp. 256, map. Price 5s.

This addition to the well-known series of Silver's Handbooks is an important step towards a descriptive history of the British Colonies, of which the Australian and South-African parts are already completed; and it supplies a public want of some magnitude, as the treatises on emigrational geography issued both officially and privately upon British North America are either too limited in area and aim or too evidently highly coloured to be accepted as safe guides.

The present volume naturally contains more details on history and physical geography than its predecessors; and the best authorities have evidently been consulted upon the geological, zoological, and other scientific points necessarily discussed in the general account.

The map, though very clearly engraved, and showing the chief physical features of British North America, is on far too small a scale (260 miles to the inch) to give more than a general aspect; it is, however, well worked up to date, and shows the railroads in operation and projected, and provincial capitals, with an inset of the chief lines of cable communication.

AUSTRALASIA.

Schmeltz, J. D. E., and Krause, R.—Die ethnographisch-anthropologische Abtheilung des Museum Godeffroy in Hamburg. Ein Beitrag zur Kunde der Südsee-Völker. Hamburg (Friederichsen): 1881, 8vo., pp. 687, plates, map. (*Williams and Norgate:* price 1*l.* 5*s.*)

This illustrated descriptive catalogue of the ethnographic and anthropological section of the great museum of the Godeffroy Company in Hamburg, contains a mass of detailed information referring to the inhabitants of the numerous oceanic groups of islands with which that body has traded, preceded by an introductory sketch and table of characteristics of the Papuan and Malayan (Polynesian) races, and containing a copious bibliography. The map (by Perthes) gives the whole of the groups, and is coloured ethnographically.

GENERAL.

Comoy.—Étude pratique sur les Marées fluviales et notamment sur le Mascaret, application aux travaux de la partie maritime des fleuves. Paris (Gauthier-Villars): 1881, 8vo., Text, pp. 389, and atlas. (*Dulau:* price 12*s.* 6*d.*)

Although intended to be of practical utility to hydrographic engineers, this work may be mentioned here as apparently the only one specially devoted to the discussion of the curious fluvial phenomenon known as "bore," or "eagre." The atlas contains representations of tidal curves in various localities.

Geographisches Jahrbuch.—Begründet 1866 durch E. Behm. VIII. Band, 1880. Unter Mitwirkung von A. Auwers, C. Bruhns, O. Drude, K. v. Fritsch, G. Gerland, J. Hann, K. v. Scherzer, L. R. Schmarda, H. Wichmann, K. Zöppritz, herausgegeben von Hermann Wagner. Gotha (Perthes): 1881, 12mo., pp. 653. (*Barthés & Lowell:* price 10*s.*)

The little geographical manual instituted in 1866 by Dr. Behm, and which has appeared biennially under his editorship until now, retains in the hands of his old collaborateur, Dr. Wagner, the varied utility for which it has hitherto been conspicuous. The mere title of contents, indeed, shows a determination to advance the claims of geography as a special science, by its classification of subjects upon a new basis, under (1) a special part referring to the individual geographical sciences, and (2) a general section treating of the application and record of them as a whole. In part 1, Professor Zöppritz contributes an account of the present status of Terrestrial Physics, or Physical Geography in the widest acceptation of the term, distinguishing such points as refer to the earth as a whole from those relating only to its surface; followed by a record from Professor Bruhns of the latest progress in European territorial surveys, and a list of the geographical positions of 144 observatories by Auwers. Professor v. Fritsch supplies a geographically arranged account of the most recent experiences on the subject of geographical distribution of geognostic formations (the "geographical geology" of Delesse); Professor Hann gives his usual record of geographical meteorology; Professor Drude and Dr. Schmarda respectively contribute, as before, papers discussing the latest discoveries in the geographical distribution of plants and animals; ethnological progress is recorded by Professor Gerland; and Dr. von Scherzer concludes the special part with some contributions on the extension, &c., of commerce.

Professor Wagner heads the general section with an elaborate treatise on the development of scientific methods of studying geography (continuing his first paper on the same subject in vol. vii. of the 'Jahrbuch'), in which he analyses the present condition of geography considered as a separate science in the chief European countries, giving a list of the professorial chairs in European Universities and higher educational institutions. An interesting detailed account, by Professor Wagner and H. Wichmann, of geographical societies, congresses, and publications throughout the world completes the volume.

Kiepert, H.—A Manual of Ancient Geography. Authorised translation from the German (by G. A. M.). London (Macmillan): 1881, cr. 8vo., pp. 309. Price 5*s.*

Chiefly of value for educational purposes, this compendious outline supplies a want in English geographical literature, and will be found of value for referential purposes to those to whom such larger treatises as Bunbury's 'History of Ancient Geography' are inaccessible. It has a wide circulation in Germany, serving as an historical and physical commentary to Kiepert's atlases of ancient geography, so long in use in that country, and now to some extent also in England. The translation has been throughout carefully revised by the author. Some little strangeness in the transliteration of Greek names will strike the reader accustomed to Latinised forms; but the index follows the German edition and the atlases above mentioned in using only the latter orthography.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Austrian Government.—Specialkarte der Oesterreichsch-Ungarischen Monarchie. Scale 1 : 75,000 or 1 geographical mile to an inch. 1881. Price of each sheet, 1*s.* 4*d.* (*Dulau.*)

The following sheets are just published:—Zone I., Col. 10, 11, 12. Zone IV., Col. 13, 14. Zone V., Col. 11, 12, 14, 17. Zone VI., Col. 14. Zone VII., Col. 13. Zone VIII., Col. 14. Zone IX., Col. 13. Zone X., Col. 20. Zone XX., Col. 12. Zone XXI., Col. 9, 10, 11. Zone XXII., Col. 9. Zone XXIII., Col. 9.

—— Administrativ-Karte von Nieder-Oesterreich. Herausgegeben vom Vereine für Landeskunde. Scale 1 : 28,800 or 2·5 inches to a geographical mile. Sheets:—24. Zwettl. 48. Stein-Mautern. Artaria & Co., Vienna. Price 1*s.* 9*d.* each sheet. (*Dulau.*)

Dosseray, J.—Carte Physique, Politique & Administrative de la Belgique, contenant les noms de toutes les communes, des hameaux principaux, les chemins de fer, routes, canaux, &c., &c. Scale 1:320,000 or 4·3 geographical miles to an inch. J. Dosseray, Brussels, 1880. Price 3*s.* (*Dulau.*)

Hahr, August.—General-Karta öfver Sverige, Norge och Danmark, samt öfver angräntande delar af östersjöländer jemte jernvägskommunikationer. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. August Hahr. F. & G. Beijer, Stockholm, 1880. Price 16*s.* (*Dulau.*)

Imperial Russian Geographical Society.—Karte des Europ. Russland, in 12 Bl. 40 Werst auf den Zoll. Zweite bedeutend vervollständigte und verbesserte Aufl., mit Angabe der Eisenbahnen für 1879. Herausgeg. von d. K. Russ. Geogr. Gesellsch. St. Petersburg, 1880. Price 15*s.* (*Dulau.*)

Intelligence Branch, Quartermaster-General's Department.—Outline Map giving the various proposed boundaries between Montenegro and Albania from the Adriatic Sea to near Gusinji. Scale 1 : 150,000 or 2 geographical miles to an inch. Captⁿ. M. T. Sale, R.E., Commissioner, Intelligence Branch, Quartermaster-General's Department, 1880.

L'Institut Cartographique Militaire.—Carte des Chemins de Fer, Routes & Voies Navigables de la Belgique. Scale 1 : 320,000 or 4·3 geographical miles to an inch. Publiée par l'Institut Cartographique Militaire, Brussels, 1880. Price 2*s.* (*Dulau.*)

This is one of the numerous maps of Belgium, which have been published with a view to provide information as to every possible means of communication. It is a well-drawn map, the rivers are shown in blue, and the other means of communication are all clearly distinguished from each other, and could not fail to be useful to any stranger travelling in Belgium.

Prussian Government.—Karte geologische von Preussen und den Thüringischen Staaten. Scale 1 : 25,000 or 2·9 inches to a geographical mile. Herausgegeben durch das Königl. preuss. Ministerium der öffentl. Arbeiten. Mit Erläuterungen. Lieferung 15, containing: Langenschwalbach, Platte, Eltville, Wiesbaden, Königstein, Hochheim & Grad. Abth. 67, 68. Price 12*s.* (*Dulau.*)

Reitzner, V. v.—Generalkarte von Griechenland, Thessalien und dem Epirus. Nebst einem Supplementblatte, enthaltend Albanien, Rumelien und Macedonien. 2 sheets. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Schworella, Vienna, 1880. (*Dulau.*)

Rössel, Th.—Reliefkarte d. Königreich Bayern. Scale 1 : 1,500,000 or 20·4 geographical miles to an inch. Eckerlein, Leipzig. Price 1*s.* (*Dulau.*)

Stolpe, C.—Plan von Constantinopel mit Vorstädten, Hafen und einem Theile des Bosporus. Scale 1 : 15,000 or 4·8 inches to a geographical mile. Lorentz, Constantinopel, 1880. Price 3*s.* 6*d.* (*Dulau.*)

Wipper, J.—Wall Map of European Russia (in Russian language). Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. Leipzig. 6 sheets. Price 1*l.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

6-inch—County Maps:—

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Town Plans—10-feet Scale:—

ENGLAND AND WALES: Beds: Luton, in part, 6 sheets at 2*s.* Berks: Newbury, 12 sheets at 2*s.* Derbyshire: Glossop, in part, 6 sheets at 2*s.* Herts: Ware, 11 sheets at 2*s.* (*Stanford, agent.*)

ASIA.

Indian Government Surveys:—

I.—Eastern Bengal, Assam, Burma, and parts of China and Siam, mostly adapted from the maps of the Surveyor-General of India. By Robt. Gordon, Esq., M.I.C.E. and M.I.M.E. Scale 1 : 2,700,000 or 37·1 geographical miles to an inch.

II.—Maps showing various theories on the origin of the Irawadi River.

III.—Gauge Readings of the Irawadi River at Myanoung, 1869 to 1878.

IV.—Discharges of the Irawadi River at Saiktha and Myanoung.

V.—Gauge Readings of the Irawadi River. Stations from Saiktha to Donabyoo.

VI.—Gauge Readings of the Nawoon River. Stations from Nawoon to Taboo. For the years 1875–77.

VII.—Map of the Irawadi Delta. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch.

VIII.–XIX., XXI., XXII., XXIV.–XXVIII.—Plans and Sections of Irawadi River.

XX.—Maps showing the Irawadi Embankment Works in the flood years 1868, 1871, 1875, and 1877; with the Breaches in each year. Scale 1:1,124,200 or 15·4 geographical miles to an inch.

XXIII.—Discharge Observations and Scales of the Ngawoon at Thapangyo for the years 1872, 1873, 1875, and 1878.

XXIX.—Gauge Readings of the Nawoon River. Stations from Nawoon to Taboo. For the years 1875–79.

Gulf of Burma, showing Delta of Irawadi River, the Hline Valley and Pegu Sub-Yoma Plains. Photozincographed at the Surveyor-General's Office, Calcutta, 1880.

Hooghly River Survey: from Cossipore to Barrackpoor. Surveyed November 1875. Scale 6 inches to 1 mile; on two sheets.—Sketch of Garden Reach from Camber Batchie's Point to below Jessop's Wharf (Hooghly River). Surveyed December 1877. Scale 500 feet to 1 inch.—The River Hooghly from Garden Reach to Oolabareah. Surveyed in June, July, and August 1875. Scale 1000 feet to 1 inch; on 2 sheets.—From Acheepore to Pookooreah Point (Hooghly River). Compiled from the latest surveys, 1878. Scale 1000 feet to 1 inch; on 2 sheets.—Royapore Anchorage (Hooghly River). Surveyed September 1879. Scale 500 feet to 1 inch.—From Pookooreah to Fulta Point (Hooghly River). Surveyed May 1878. Scale 1000 feet to 1 inch.—River Hooghly, Pookooreah Point to Fulta Point. July 1880. Scale 1000 feet to 1 inch.—Fisherman's Point Anchorage. Surveyed June 1875. Scale 1000 feet to 1 inch.—River Hooghly, Fultah Point to Hospital Point. May 1880. Scale 1000 feet to 1 inch; on 2 sheets.—The River Hooghly, from Fultah Point to Roychuck. Surveyed March 1879. Scale 1000 feet to 1 inch.—The James and Mary's and Nynan. Surveyed October 1873. By Samuel Reed, Assistant River Surveyor. Scale 1000 feet to 1 inch.—From Kantabariah to Luff Point (Hooghly River). Surveyed June 1878. Scale 500 yards to 1 inch.—The River Hooghly from Kantabariah to below Mud Point. Surveyed November and December 1879. Scale 1000 yards to 1 inch.—Kulpee Roads (River Hooghly). Surveyed October 1879. Scale 500 yards to 1 inch.—The Channels from Kulpee to below Mud Point. Surveyed November and December 1879. Scale 1000 yards to 1 inch.—The Rangafulla, Mud Point, and New Jellingham Channels. Surveyed August and September, 1867. Scale 1000 yards to 1 inch.—The Rangafulla, Mud Point, Jellingham, and New Bellary Channels. Surveyed September 1872. Scale 1000 yards to 1 inch.—The Bellary, Rangafulla, Mud Point, and Jellingham Channels. Surveyed July 1874. Scale 1000 yards to 1 inch; on 2 sheets.—Sketch of the lower part of the Rangafulla and the Mud Point Channels. Surveyed January 1875. Scale 1000 yards to 1 inch.—The Bellary, Huldea, and Jellengham Channels. Surveyed November and December 1877. Scale 1000 yards to 1 inch.—The Mud Point Channel (Hooghly River). Surveyed December 1875. Scale 1000 yards to 1 inch.—River Hooghly. Mud Point to Saugor. March 1880. Scale 3000 feet to 1 inch; on 2 sheets.—The Dredge, Bedford's, and Auckland Channels. Surveyed February and March 1874. Scale 2000 yards to 1 inch. Also a later edition. Surveyed December 1874.—The Dredge, Bedford's, Auckland, and Eden Channels. Surveyed February and March 1877. Scale 1000 yards to 1 inch. Another edition. Surveyed March 1878.—The Eden and Auckland Channels, including Old Dredge and Bedford's. Surveyed February and March, 1879.—Channel Creek, as surveyed in July 1861. Scale 2000 feet to 1 inch.—Channel Creek, from Yonge's Point to Smith's Point, &c. Surveyed March 1867. Scale 2000 yards to 1 inch.—Rough sketch of Channel Creek, between Yonge's Point and Smith's Point, showing the new buoys to be laid and the present channel. 1867. No scale.—Channel Creek, from Mud Point to Pocock's Point. Surveyed August 1874 by J. H. Nickles. Scale 2000 feet to 1 inch.—The Entrances to the River Hooghly from Sand Heads to Mud Point. Compiled from various surveys of recent date. 1875. Scale 2 miles to 1 inch.—Entrance of the River Hooghly, from the Eastern Channel Light Ship to Saugor Lighthouse. Surveyed January and February 1874. Scale 1 inch to 1 mile.—The Channels from Saugor to Bell Buoy. Surveyed January and February 1879. Scale 2000 yards to 1 inch.—From Sand Heads to Saugor. Surveyed January and February 1878. Scale 1 mile to 1 inch; on 2 sheets.—River Hooghly. Saugor to the Sand Heads. January 1880. Scale 6000 feet to 1 inch; on 2 sheets.—The Gaspar and Thornhill's Channels (Hooghly River). Surveyed January and February 1875. Scale 2000 yards to 1 inch.—Skeleton sheet showing the positions, bearings, and distances from each other of all the outside buoys. Compiled from the most recent surveys. October 1879. Scale 2000 yards to 1 inch; on 2 sheets.—Sketch showing present positions of the Houses of Refuge on the sea-face of the Soonderbuns. August 1877.—Soonderbuns, showing site of Refuge Houses. 1880. Scale 4 miles to 1 inch. (*Stanford, agent.*)

Intelligence Branch, Quartermaster-General's Department.—Map of the Tekke Turkoman Country and adjoining Districts. Scale 1:1,013,760 or 13·8 geographical miles to an inch. Compiled and zincographed at the Intelligence Department, Horse Guards. 1881.

AFRICA.

Berghaus, Dr. H.—Physikalische Wandkarte von Africa. Scale 1:8,000,000 or 109·5 geographical miles to an inch. 6 Sectionen. Cromolith. Justus Perthes, Gotha. With explanation in 8vo. Price 6*s.* (*Dulau.*)

Intelligence Branch, Quartermaster-General's Department.—Sketch Map showing Lines of Communication between Newcastle and the Transvaal. Scale 1:253,440 or 3·4 geographical miles to an inch. Compiled at the Intelligence Department, Horse Guards, January 1881.

Petermann's 'Geographische Mittheilungen.'—Dr. W. Junkers Reisen in Nordost und Central Afrika: Blatt No. IV.: Karte der Route durch das Thal des Chor Baraka in die Ägyptische Provinz Taka, v. 1, bis 30, März 1876. Mit Berücksichtigung der neuesten Reisen u. Erforschungen im Nördlichen Ägyptisch-Abessinischen Grenzgebiet, bearbeitet und gezeichnet von B. Hassenstein. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 3. Justus Perthes, Gotha. (*Dulau.*)

—— Originalkarte einer Reiseroute von Ladó bis Dara, nach der Itinerar-Aufnahme von R. W. Felkin & Rev. C. T. Wilson, M.A., Sept. bis Dec. 1879, construirt u. gezeichnet von B. Hassenstein. Scale 1:2,000,000 or 27 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881. Tafel 4. Justus Perthes, Gotha, 1881. (*Dulau.*)

AMERICA.

Muret, Ch.—Relief of the Canal of Panama, approved by the Academy of Sciences. By Ch. Muret, Geometer of the Town of Paris, Member of the Society of Geography. Scale 1:200,000 or 2·7 geographical miles to an inch.

This is a very well executed Relief Map, and at a glance conveys to the mind the physical features of the country through which the proposed ship canal will have to pass. The elevations have been given in bold figures in order to make more apparent the undulations of the ground where the cutting for the canal will have to be made. The full dimensions of the canal, both in English and

French measures, are given, as well as those of the necessary dams. The distances are given from London, Liverpool, and New York, to many of the chief ports of the world, both by Cape Horn, and also by the abbreviated route through the proposed canal, as well as the saving in distance that will be made by the latter route.

Judging from the map, there would seem to be an extensive system of dams required to keep back the waters of the Rio Chagres, The line of the proposed canal runs in close proximity to the present railroad. The vertical scale of this map is doubtless exaggerated (as is indeed usual in Relief Maps of large districts) in order to show more plainly the slight elevations.

Petermann's 'Geographische Mittheilungen.'—Die Argentinischen Territorien der Pampa, des Rio-Negro, &c. Nach den Aufnahmen der Expeditionscorps gegen die Indianer, unter General D. J. A. Roca. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881. Tafel 5. Justus Perthes, Gotha, 1881. (*Dulau.*)

AUSTRALIA.

Jones, James W.—Plan showing Country North-East of Eucla (South Australia). Examined by Mr. James W. Jones, with the view to decide upon boring operations for water. 1880. Scale 1 : 615,000 or 8·4 geographical miles to an inch. Surveyor-General's Office, Adelaide.

This Map accompanies Mr. James W. Jones' Report on "Examination of Country North-East of Eucla."

Pennefather, Captain C.—Plan of Batavia River. Lat. 11° 51′ S., long. 141° 55′ E. Scale 1 : 63,360 or 0·8 geographical mile to an inch. Brisbane, 1880.

This Map accompanies the Report of Captain C. Pennefather on the "Exploration of the Coen, Archer, and Batavia Rivers."

Surveyor-General of Queensland.—Map of Queensland. Scale 1 : 1,025,000 or 14 geographical miles to an inch. Compiled at the Department of Public Lands, Brisbane, 1881.

When complete, this map will consist of six sheets; at the present time only three of these are published, viz.:—1, 2, and 3. Sheets 1 and 2 include eleven degrees of latitude, from 18° S. to 29° S., and 9 degrees of longitude (i. e.) from 145° 30′ to 154° 30′ E. Sheet 3 includes those portions of Queensland and South Australia contained between lat. 23° 40′ S., and 29° 20′ S., and long. 136° 40′ to 145° 30′ E. This map is very clearly drawn, and is published on a sufficiently large scale to make it very useful; it also contains a large amount of information as to the routes of exploration, divisions, and means of communication.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in January and February 1881.

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199	*m*	=	0·23	Adriatic sea :—Brindisi to Ortona. (Plans, Viesti, Manfredonia, Trani, Barletta, Bisceglie, Molfetta, Bari, Mola, Monopoli, Pianosa island, Pelagosa island, Tremeti, islands). Price 2*s.* 6*d.*

210 Plan added, Miyako bay.

603 Plan added, Alongubuna anchorage.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

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451	Falmouth or Martha-Brae harbour	Sheet of plans, Falmouth harbour, Annatto bay, St. Ann bay, Port Antonio	451
452	St. Ann's bay		
453	Port Antonio		
1379	Annatto bay		
199	Monopoli to Fossaceca	New chart, Brindisi to Ortona	199
1500	Tremeti islands		
1642	Plan of ports		
265	Sealing bight and St. Francis harbour.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2567. England, east coast:—Tees bay. No. 2891. China sea:—Ports in Philippine islands. No. 811. China:—Anchorages between Black head and Crab point. No. 1601, China:—Wusung or Wongpu river. (*J. D. Potter, agent.*)

United States Hydrographic Office.—Chart No. 867. Sandwich Islands, South side of Oahu. Published December 1880. Price 2*s.* 1*d.*—No. 873. Anchorages on the West Coast of Guatemala. Published January 1881. Price 1*s.* 8*d.* Hydrographic Office, Washington, D.C. J. C. P. de Krafft, Captain U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

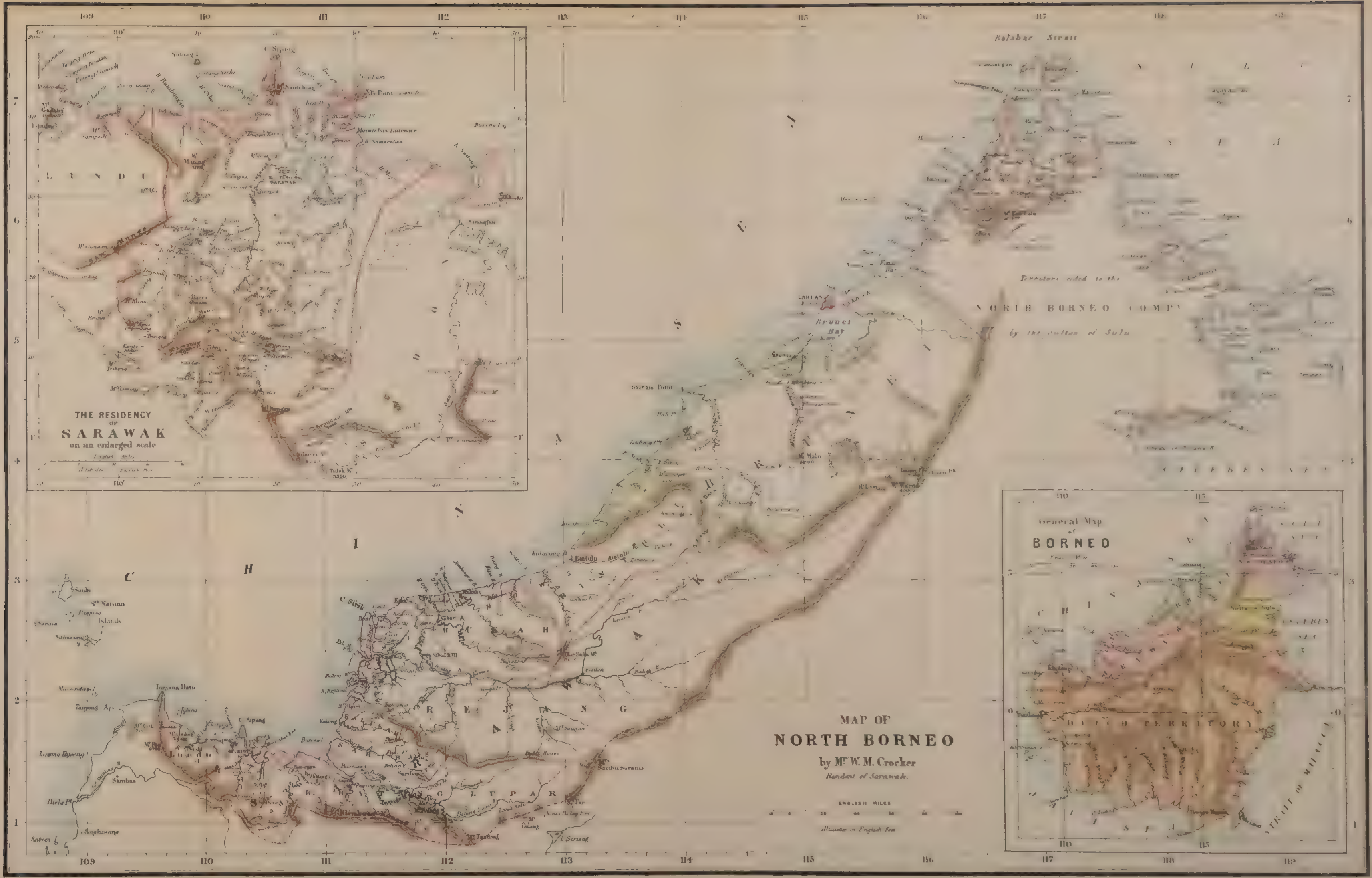
Bevan, G. Phillips, F.S.S., F.G.S., &c. — The Statistical Atlas of England, Scotland, and Ireland. Edited by G. Phillips Bevan, F.S.S., F.G.S., &c. To be completed in fifteen Parts, each containing three coloured maps and letterpress. Part II. Educational. Part III. Industrial. W. & A. K. Johnston, London and Edinburgh, 1881. Price 7*s.* 6*d.* each part.

Saint-Martin, M. Vivien de.—Atlas Universel de Géographie Moderne, Ancienne et du Moyen Age, construit d'après les sources originales et les documents les plus récents, Cartes, Voyages, Mémoires, Travaux Géodésiques, &c. Avec un Texte Analytique par M. Vivien de Saint-Martin, Président Honoraire de la Société de Géographie de Paris, &c. &c. Environ 110 Cartes, gravées sur cuivre sous la direction de MM. E. Collin et Delaune. 3_e Livraison, contenant : Iles Britanniques (Angleterre). Iles Britanniques (Écosse et Irlande). Monde connu des Grecs avant Alexandre. Hachette et C^{ie}, Paris, 1880. Price 4*s.* 6*d.* (*Dulau.*)

Selander, N.—Atlas öfver Sverige, efter Generalstabens Generalkarta, redigerad af N. Selander, Kapten vid Generalstaben. Häft 1. Scale 1 : 1,015,000 or 13·9 geographical miles to an inch. Stockholm, Looström & Co., 1880. Price 2*s.* (*Dulau.*)

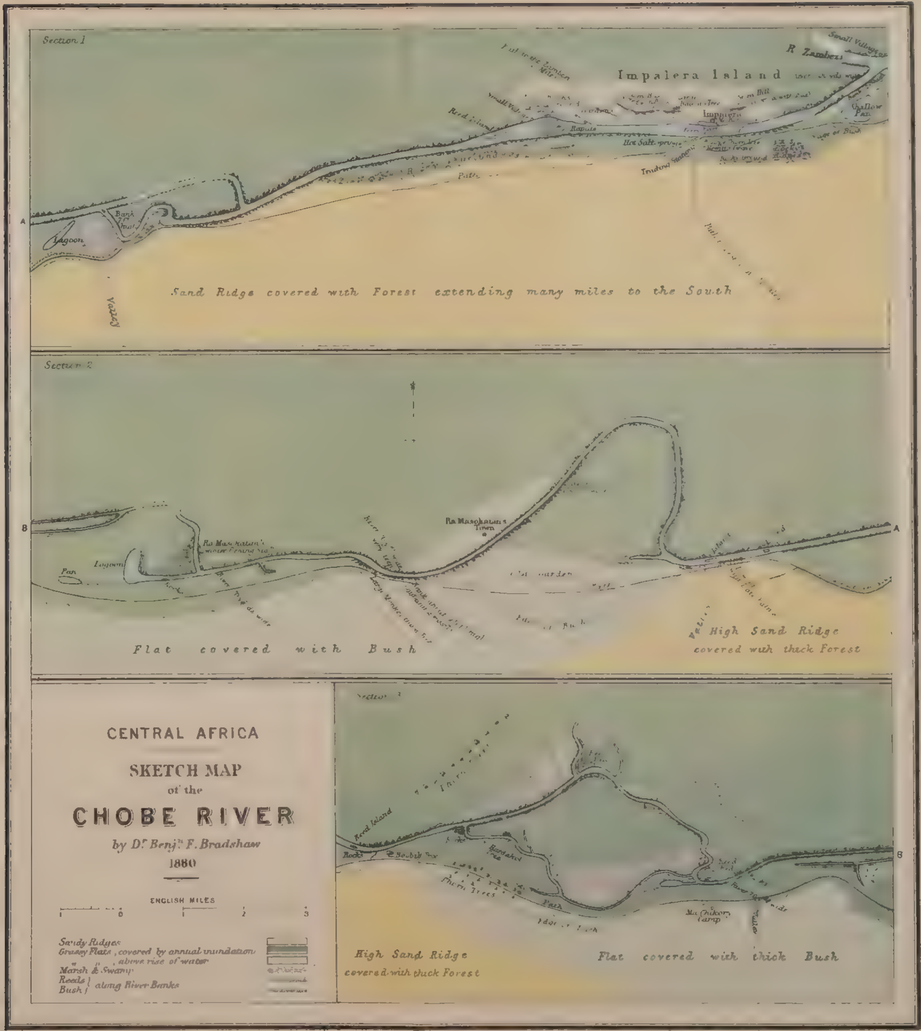
EDUCATIONAL.

Bamberg, K.—Schul-Wandkarte von Nordamerika. Scale 1 : 5,300,000 or 72·6 geographical miles to an inch. Berlin. Cromolith. in 16 sheets. Price 12*s.* (*Dulau.*)



W.J. Turner, R.G.S., Del.

Pubd for the Proceedings of the Royal Geographical Society 1881.



CENTRAL AFRICA

SKETCH MAP
of the
CHOBE RIVER
by Dr. Benjn. F. Bradshaw
1880

W. J. Turner, R.G.S. Del.

Published for the Proceedings of the Royal Geographical Society, 1881.

Edwd. Weller

PROCEEDINGS
OF THE
ROYAL GEOGRAPHICAL SOCIETY
AND MONTHLY RECORD OF GEOGRAPHY.

Lake Nyassa, and the Water Route to the Lake Region of Africa.

By James Stewart, C.E.

(Read at the Evening Meeting, March 14th, 1881.)

Map, p. 320.*

About two years ago a paper was read before this Society, by Dr. Stewart, on the second circumnavigation of Lake Nyassa, and on the same evening extracts were read, by Mr. Stevenson, from a report by Dr. Laws and myself of our journey of exploration of the previous year, along the coast of the lake.† The paper, which I have now the honour to submit, will describe the remainder of the west coast, as well as give an account of my journey across the district lying between the two great lakes Nyassa and Tanganyika.

I will first mention the advantages and facilities we have at Livingstonia for the prosecution of geographical research. We have in our own station, and in the immediate neighbourhood, a number of natives, who for the last five years have known us personally and have worked for us; who have been in the habit of looking up to us for advice and assistance, and who, we believe, hold us in some esteem and regard. These men we can count upon to go with us wherever and whenever we choose, and to abide by us in all circumstances; men who are accustomed to the country, who can readily fraternise with all the people they meet, whose wants are few and easily supplied, and whose scale of wages is wonderfully low. Figures will best explain this. The total cost of my expedition of last year to Lake Tanganyika, extending over three months and ten days, was 87*l.*, not of course including my own time, or somewhat less than 30*l.* per month. This sum is so small that I trust to be in a position frequently to make such journeys. But against all these advantages are the claims of other work, which prevent us from engaging in extensive explorations. What we have done in the past, has been in a manner forced upon us, certainly not against our will, but it has been rendered necessary by the gradual expansion of our work, and by the desirability of obtaining a general view of the whole of the Nyassa district, before deciding on the system and the scope of our future work there.

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* See also Maps in 'Proceedings,' vol. i. p. 352, and vol. ii. p. 464.

† 'Proceedings,' vol. i. p. 289.

In Captain Elton's journals notice is taken of the want, or rather of our ignorance, of safe harbours on the lake coast. This ignorance has now passed away. Besides the bay at Livingstonia, we have found that there are no fewer than ten good harbours or anchorages on the west coast. The first is north of Mount Rifu; the second at Kota-Kota; the third at Unaka; the next at Bandawe; then at Ngkata; then at Kuta Bay; the next at a nameless bay 10 miles further north; then Deep Bay; then the Kambwe lagoon; and lastly the Rombashe river at the north end of the lake. On the east coast we know of three good anchorages, so that we have now seldom to face, in the open, the pitiless storms which are so common. There are two convenient wooding depôts, at which we are seldom delayed more than a day. This increased knowledge of the lake we now possess, has reduced to a fortnight or three weeks the time required for the voyage round the lake, which used to be about six weeks.

Remarks have been made here and elsewhere about the mountains of Lake Nyassa. Some have even refused to call them mountains, and prefer to call them an escarpment of the great plateau of Central Africa. I do not agree with them. There is a well-defined range of mountains along the whole of the west coast, appearing even from the upper plateau as mountains. Numerous peaks and mountain spurs rise 2000 and 3000 feet above the general level of the plain. At the northern end this is very marked. Maliwandu's village, whence a clear view westwards can be had, nestles at the base of lofty mountains, which lie between it and the lake. But by none of the routes to the highlands has the full height of the mountains to be overcome. The passes open out on the plateau, while still on either hand mountain masses rise high overhead. On the eastern side, the Konde or Livingstone range rises 6000 feet above the lake, or at least 2000 feet above the general level of the plateau. Mr. Thomson, whose paper I listened to with much pleasure some months ago, prefers to call Konde a plateau. I cannot look upon it as other than the continuation of the Livingstone range, which, beginning in lat. 11° S., extends, as Mr. Thomson describes it, "round the north and east sides of Lake Nyassa half-way to Tanganyika, and round Lake Hikwa or Leopold." The difficulty in identifying the Konde Mountains with the Livingstone range was perhaps due to the strange configuration given to the north end of Lake Nyassa by its first circumnavigator, Mr. E. D. Young. In my last visit to the north end I was able to eliminate the error. The last 50 miles of the lake trend north-west, and the Livingstone range takes the same direction, turning more and more to the westward as it stretches north. I have no hesitation in accepting

Captain Elton's description of the Konde Mountains as crossing his route at right angles, or from east to west, nor have I any in connecting them with the Livingstone range which bounds Lake Nyassa on the north. The mistake in longitude which Mr. Stevenson referred to two years ago, I now correct by placing the mouth of the Rombashe river in E. long. 33° 50′ 30″ and S. lat. 9° 34′ 30″.

A short account of the seasons and the weather on Lake Nyassa may be useful. The year can be divided into only two seasons, the rainy and the dry. During the last week of October, when the sun is vertical, a few days of rain may be expected, but this is not the beginning of the rainy season. The rains usually begin about the 1st of December on Lake Nyassa. Further north, and at Pambete on Lake Tanganyika, they begin a month earlier, if my experience in 1879 was a usual one. Perhaps there the October rains really mark the beginning of the wet season. The rains last till April, sometimes even into the month of May. At Livingstonia, on Cape Maclear, the average rainfall is about 30 inches. Lying on a promontory jutting northwards into the lake, it is disadvantageously situated to catch the rain. Frequently heavy showers are seen passing down the east and west shores of the lake, while Cape Maclear receives not a drop. At our sub-station at Bandawe, two degrees further north, as much as 86 inches of rain have been registered, and that in a season which the natives complained of as being too dry. Between May and October there very seldom is any rain. The soil gets dry and parched; the rank grass withers up and assumes the appearance of golden grain in England in July, only, however, to fall before the fiery storms which sweep across the country in September. This want of cold weather rains is a serious hindrance to agricultural operations. European cereals and vegetables cannot be raised without irrigation. In the dry plains of Northern India, Christmas rains and rains in February may be confidently looked for, and on them depends the success of the great wheat crop of the Punjab. Nothing corresponding to them is found in the Nyassa region of Africa.

With the change of season a change in the direction of the wind occurs, or more correctly the latter is the cause of the change of weather. Winds from the north prevail from November to May, bringing with them the moisture-laden clouds from the Indian Ocean, while during the whole of the dry weather southerly winds prevail. The constancy of those winds is a source of trouble and expense to us. In May, for instance, it is easy and pleasant sailing to go to the north end of the lake, but to return in the same month requires a constant fight with the elements for ten days or a fortnight, taxing our courage as well as our seamanship.

It is well known that the barometer in tropical countries is not subject to such rapid changes as in northern latitudes. At Livingstonia the annual range is only about half an inch, or from 28·20 inches in

November to 28·70 inches in June. The diurnal variation is rarely more than twenty hundredths of an inch. The barometer is therefore of little use as a weather-glass, but on the other hand it is more serviceable for geographical work in the measurement of mountain heights.

The temperature on Lake Nyassa is very equable. The average midday temperature of the hottest month, November, is 85° F., and the average night temperature of the coldest month, May, is about 60°,—a range of only 25° throughout the year. Occasionally, however, we have days at 95°, and even 100° has been registered once or twice. At the other end of the scale 54° has been the lowest. As a general rule, the wet-bulb thermometer stands at 10° below the dry bulb throughout the dry months of the year.

The system of languages spoken in the lake region presents a wide field for philological work and research. Lake Nyassa is about 350 miles in length, yet in that comparatively small district of Africa, no fewer than seven different languages are spoken on one side of the lake only. These I believe all belong to the great Bantu group of languages, which prevails from the Cape of Good Hope to nearly as far north as Zanzibar on the eastern side of the continent. These languages, however, are so different from each other, that natives even, from the south of the lake, cannot understand the language spoken at the northern end. These languages do not present any particular difficulty of construction, beyond a peculiar system of concords, by which noun, adjective, pronoun, and preposition are supplied with a certain prefix, which may follow the rules of one or other of seven different cases of concord. The language is liquid and musical, as the syllables invariably end with a vowel, and almost invariably are of the one uniform length of two letters. It therefore will lend itself readily to music, this difficulty only being found, that in speaking the emphasis almost always falls on the penultimate syllable. Africans are commonly supposed to be a musical people. This can hardly be said of the Nyassa people. They have indeed a good ear for music, and many of them have fine voices, but their musical taste has not been cultivated. They have no musical instruments worthy of the name, and no tribal songs or airs, as far as we have yet been able to discover. Over their camp fires one of them will often lead in a recitative chant describing the events of the day, while the audience joins in a refrain or chorus, which is all the better appreciated if it contains a joke or a hit at any member of the party. For instance, one song they used to sing at their work at Livingstonia when Mr. Young was there, ran thus:—

> "We bring chickens here for sale,
> And yet he makes us work so hard;
> We bring bananas here for sale,
> And yet he makes us work so hard."

This song must not be taken as indicating any real grievance.

The language which is now most widely disseminated through the country to the west and north of the lake is the Kafir language. It is not, however, the most generally spoken. The Kafir or Mangone invaders have wandered over the whole of the district, and wherever they have been, they have left a knowledge of their language among the residents of the country, many of whom they had subjugated and enslaved during the period of their occupancy. Such men were frequently my interpreters in the highlands of Mambwe and Maliwandu. This language has for years past been reduced to writing. The Scriptures and other books have been translated into it, and newspapers are now published in it, at the Missionary Institution at Lovedale. This fact facilitates our work among them very greatly. None of the other languages, however, have been reduced to writing, they contain no store of information, they have no history or poetry laid up in them, so we have chosen English as the classical language of the educated native of the future. Already some progress has been made in this. Not a few of our pupils are able to read an English book for themselves, and some of them can render a simple account, of work done or payments made, in English figures.

Our work in the past has been a good deal confined to two portions of the lake shore. We are arranging now to extend our operations to several new localities and to tribes that we have visited in our journeys, and who we know are prepared to welcome us. Since this extension has been determined on, large contributions have come in for the work; a total of 11,000*l.* having been promised within the last three months.

The best season for travelling throughout the Nyassa country is from July to November. Earlier than that the rank vegetation is a serious hindrance to marching, and by concealing the view, greatly perplexes the traveller in forming an accurate idea of the lie of the country. Before the grass is thoroughly dried up, heavy dews fall every night and load the tall feathery grass with countless drops of water, which the luckless traveller receives on his neck and shoulders, much to his discomfort and indeed to his danger, as before the physical energies have been called into play in the morning by continued action, the system is peculiarly liable to chill, and to its accompaniment—fever.

To make a short digression, I think travellers may well take a hint from the native practice of never bathing in the morning. The English plan of having a morning tub is quite unsuited to the country, and is highly dangerous. The better way is to do as the natives do, and wait till the sun is high in the heavens, and the day's march finished or nearly so, before plunging into water.

After July the vegetation is burnt up, the road is clear, and the view open. The intense cold in the mountainous districts is passing away as the sun returns southwards; the swamps and sponges are drying up, and the rivers are easily fordable. Later than November, on the other hand, the annual rains may be expected.

These months therefore I chose for my journey in the end of 1879. The plan I laid out for myself was to start from our sub-station at Kaningina, march to Karonga's village on the Kambwe lagoon, and thence, time permitting, to cross to Pambete on Lake Tanganyika. Owing to many circumstances, the start was delayed longer than was desirable ; but on September 10th I left Livingstonia in the *Ilala* with thirty natives, some of whom were to act as guard, and the rest as ordinary carriers. Chimlolo, one of our most faithful men—and an adherent of the Universities' Mission in 1863—acted in the same capacity as in the previous year as sergeant and caravan leader. On the 13th I reached Bandawe, and there I found Mr. John Moir who was to accompany me. On the 15th we landed at Ngkata Bay, having brought on six of Mr. Moir's carriers and four new recruits. On the 17th we reached Kaningina; then making our final arrangements, and taking William Koyi, Kafir evangelist from Lovedale, with us, we proceeded on our journey. Our road led over the highest point of Mount Kaningina, about 5000 feet above sea-level, and was very rough and steep. We camped on its western side, and at midday on the 19th reached Chipatula's village, the first of the Mangone villages, and were received by him in a most friendly manner. I told him of the endeavours that Dr. Laws had made in the colony to obtain teachers who might be stationed among them, and of the great interest that his account of them had created among their fellow tribesmen there, who were both willing and anxious to give expression to that interest by sending some of their educated youth to reside with them and be their teachers. It may not be generally known to this Society, that the Mangone or Maviti tribe is identical in blood and in language with the great Zulu tribe of the south, our gallant foes of two years ago.

Chipatula begged me to go on and see Mombera, the paramount chief, to give him the same account; and though I had not intended to do so, I consented. The next day, Saturday, we reached Mombera, but when I inquired for the chief I was told he was "not at home." It was soon evident that he was either designedly absent, or that he simply denied himself. We saw only inferior headmen, who expressed dissatisfaction that we had not come to settle among them, and said they did not understand why we should visit other chiefs before doing so. I have no doubt that they were sincere in their desire to make friendship with us; but an exclusive alliance only would suit them. They have lost both power and prestige within the last two years, and may now be resolving to attempt to regain both. I heard later that there are two parties in their council. Mombera and Chipatula and their headmen are desirous of peace, and are willing to invite us to come among them; while Ntwaro and Mperembe wish to keep us at a distance, and to recover their power by force of arms. It was in deference to the wishes of this party that Mombera would not see me. Two months afterwards Ntwaro broke the peace, and attacked and burned two Atimbuka villages, killing the inhabitants.

Mombera's territory is in the Kasitu valley. It is a gently undulating country, flanked by hills on all sides, and cut up by several water-courses, dry except in the rains. The Kasitu itself is the only perennial stream. The land, though poor, is cultivated to a considerable extent. Maize is chiefly grown, though in an experiment a year ago they got a small patch of wheat to ripen. Trees are few and of stunted growth. On Monday, September 22nd, we left Mombera's and marched down the Kasitu valley, the road leading nearly due north. We passed no villages till we came to Mount Bwabwa, on the east slope of which is Ntwaro's village, and camped in the Mpopomo district. Mombera's headman here received us civilly, and we obtained twelve new carriers from him, who behaved in a most exemplary manner throughout the whole journey.

On the 23rd, 24th, and 25th we passed through a deserted country, which, however, in places bore remains of old villages and gardens, with patches of cotton, castor oil, and mustard, but as a rule the soil is poor. The district is named Henga, and at present is a no man's land. On the evening of the 25th we reached the junction of the Kasitu with the Rikuru, which last is the larger stream, and comes from the west through a wild and mountainous country. The people here and in the valley whence the Rikuru comes are Atimbuka. The principal chief, whom I did not see, is named Mwendera, and lives to the west. The chief in the district we passed through is named Kanyole. We saw him, though we did not halt long at his village. He met us in a friendly manner, and we obtained abundant supplies of food, which is the best evidence of goodwill that these people can give. They are much oppressed by the Mangone, and hold them in dread. Though we could not communicate with them, friendly relations were soon established by the exhibition of some of our curiosities, which sign of goodwill was responded to by a present of pombe, in greater quantity than I felt disposed to permit my men to accept. The valley of the Rikuru north of its junction with the Kasitu is named Ntanta, and is the most fertile valley I have seen. It is some six or eight miles wide; the middle portion near the river is a swamp in the rains, and is covered by long grass, the abode of elephants, buffalo, and zebra. The western side is extensively cultivated, producing abundantly all that the natives require. It is watered by many streams of clear cold water, some of which are used for irrigation. The elevation of the valley is about 3700 feet above sea-level. The climate is cool and pleasant, and I have no doubt healthy, notwithstanding the marsh in the middle. Here I noticed an important change in the geological formation. The granite and quartz which prevail throughout the whole country from the Murchison Cataracts on the

Shiré river to Lake Tanganyika, give place to soft shale and clay schists. Taking into consideration the lie of the country, and the straight range of hills parallel to the river, and the position of the Kasitu, it is probable that the river forms the geological boundary, and that it runs in the trough of some great fault or nonconformity in the formation. The shale is very dry, and crumbles in the hand into small angular fragments. The schist is soft and micaceous. Ten miles further north I came on regularly stratified beds of hard, dark grey sandstone; dip, 1 in 2½ west and by north. The beds are two or three feet thick, but under heavy blows can be broken into thin laminæ of one-quarter of an inch.

The Rikuru valley, which I thought would have brought us gradually down to the lake-level, is at its north end blocked by hills forming the lake coast, and the river flows through winding precipitous valleys, falling 2200 feet in the last 15 miles of its course. The water, which enters the gorge clear and sparkling, leaves it heavily laden with bluish clay silt, by which its course in the clear waters of the lake is distinctly traceable for some distance. The Rikuru valley, as I have said, is the most fertile I have seen. Before the Mangone invasion, cattle were plentiful, though now there are none. It used to be thickly populated, and would be so again if peace and quiet were thoroughly established.

On Saturday, September 27th, we came down to the lake shore, to the mouth of the Rikuru, in south latitude 10° 45′ 15″. The descent to the lake is a most trying one. In two places the road is almost precipitous. In one place is a rapid fall of more than 1000 feet; it then rises again, and in the last three miles near the coast the descent is 2300 feet. The river loses much of its water by percolation before it enters the lake. Inside the bar it is in places more than five feet deep, but on the bar not more than two feet. On the 29th we marched northwards along the coast, reaching, after three miles, the stream in which is the coal discovered by Mr. Rhodes. The coal lies in a clay bank tilted up at an angle of 45°, dip west. It is laid bare over only some 30 feet, and is about seven feet thick. It hardly looks as if it were in its original bed. The coal is broken and thrown about as if it had been brought down by a landslip, and traces of clay are found in the interstices. Yet the bed is compact and full of good coal. I traced it along the hillside for some 200 yards, and found it cropping out on the surface here and there. It is 500 feet above the lake-level, and about a mile and a half from the shore. I lit a good fire with it, which burned up strongly. The coal softened and threw out gas bubbles, but gave no gas jets. It caked slightly, but not so as to impede its burning.* It is found in the main gorge of the Chisindiré valley.

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* Having submitted a specimen of the coal to Mr. Carruthers, F.R.S., Keeper of the Botanical Department, British Museum, this eminent authority has sent me the following note of the results of his examination of it:—

"The coal has the appearance of a good specimen of English coal. The lines of

Three miles further on we crossed the Rumpé river, a large stream 30 yards across, and knee-deep in the dry weather.

On the 30th we halted for a day, as an elephant had been shot, but my chief object was to climb Mount Waller. This hill is a remarkable one. The lower 900 feet is composed of sandy schists and hard and soft shales. From 900 to 1200 feet there are three bands or horizontal ribs running along the whole length of the mountain. These are of coarse, gritty sandstone, of mixed round and sharp grains, up to the size of a bean. Much of it is very soft. Over these ribs is a plateau three or four hundred yards wide, and in the middle rises the precipitous hill. Up to 2300 feet are shales soft and crumbly, then rises the cliff up to 3100 feet above the lake, or 4700 feet above sea-level. The cliff is composed of clay-slate of a dull straw colour, compact and hard, resembling Turkey whetstone, but devoid of cleavage. The beds are horizontal, ten or more feet thick, with intervening beds of crumbly shale, which, decomposing, let the hard cliff break off and fall.

On the 1st of October we marched round Mount Waller, and struck inland at nine miles, and crossed a ridge running east and west, 800 feet high, and then descended into a marsh, which extended from the hills to the lake shore and several miles to the north. The road kept well to the west, and for four days we did not touch the lake shore. The district is sparsely populated. Spots here and there have been selected and occupied by a few people, who grow bananas chiefly. Several streams run down to the marsh, and possibly do not reach the lake in the dry weather. On the south side of this marsh the people are Atimbuka, and on the north are Bachungu. As may be seen on the map, the lake trends due north from Mankambira's Point to near Deep Bay, in lat. 10° 27′, and thence turns fully 30° to the west, as far as to Kambwe lagoon, in lat. 9° 55′, running parallel to the range of mountains which, from Mount Waller, stretches to the north-west. All the country, from Mount Waller to the Kambwe lagoon, is very poor indeed; swamp and hard clay plain, broken here and there by dry gravel ridges, and occupied chiefly by large game.

At Karonga's we found some of Mr. Rhodes's men, with letters from Mr. Thomson, of the East African expedition sent out by the Geographical Society. We then heard of Mr. Keith Johnston's death, and learnt that Mr. Thomson had been at the Rombashe river, and had left for Tanganyika on September 29th.

I spent some time in inspecting the Kambwe lagoon. I am sorry

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stratification are indicated by their films of anthracite or 'mother coal.' The general form of the minute tissues are preserved in the 'mother coal.' I have observed fragments of scalariform vessels, and in sections of the coal prepared for the microscope I have found the macrospores of Lycopodiaceous plants, which I cannot distinguish from similar bodies in the coal of England. After combustion, only 1·8 per cent. of ash remains. I have no doubt that the specimen from Lake Nyassa is of the same age as the coal of England.—W. CARRUTHERS."

to say it is not a good harbour. It is perfectly safe when the steamer is once in it, but it was with difficulty that I found a six-foot channel over the bar, and inside the depth is not much greater. The river Rukuru, which until last year flowed through it, has changed its course, and now enters the lake a short distance south. Its former channel is quite silted up, and is now actually higher than the general level of the ground, so that there is no hope of its ever returning to the lagoon. It may seem strange that the river-bed should be higher than its banks. I account for it thus:—in the rains the whole country is flooded for some miles, so that the river flows in its course, marked out by thick reeds, and has for its banks the standing water of its own overspill; the heavy sand is rolled down this channel, and deposited over its whole length, till it is raised to such a height that the current is forced to leave it. On inquiry, I found that in Karonga's boyhood, say sixty years ago, the river flowed to a point some three miles to the south. That point is now being rapidly worn away, and the debris scattered along the coast. It is evident that the conditions of the coast-line are at present unstable, and that the Kambwe lagoon may be silted up and lost as a harbour very soon.

I had arranged with Dr. Laws that the *Ilala* should meet us here with fresh carriers and stores, so we waited a few days for her. On the 11th she arrived with Dr. Laws. After making all necessary arrangements, and promising to be back on December 1st, Mr. J. Moir, William Koyi, and I started on our journey to Tanganyika on October 14th. Our first day's march of 11 miles led us due west to the foot of the hills, across a dry plain, much of which, however, is under water in the rainy season. Near the coast it is fairly populous, but inland not so. We camped by the Rukuru river, at the village of Karamba. Next day we kept up the valley of the Rukuru, marching north three or four miles, and passed a few Chungu villages, which, I may state, are kept remarkably neat and clean; a space around is carefully swept, and the banana groves add their refreshing shade to make them picturesque and inviting. We then left all villages behind, and struck into the hills, marching west. Two nights we camped in the bush; and on the fourth day after leaving the lake, we reached the village of Maliwandu; elevation, 3900 feet above sea-level. The road for two days was certainly rugged and steep, but much less so than one would have expected. Having now traversed several of the passes from the lake to the highlands, I can say that this is the easiest of them all, and in prospect of a road being made here, that such a work is quite practicable, though of course presenting difficulties here and there. At Maliwandu we were quite across the hills, and had a view over a level plateau as far as the eye could reach to the south and west. To the north-west, in the direction we wished to take, were some hills. Maliwandu received us frankly and kindly. We exchanged presents with him, and he promised us guides.

Here, unfortunately, Mr. Moir and I were constrained to part company. He had suffered a good deal from blistered and swollen feet, and one sore was, we thought, a deep-seated abscess, which it turned out to be. We halted three days, and then agreed that it was better that I should push on alone, and that Mr. Moir, when able to walk, should return to Nyassa. It was fortunate we came to this conclusion so soon, as Mr. Moir was confined to his tent for ten days more. Leaving with him a few men to carry his baggage and stores, I proceeded on October 21st. I marched west for 13 miles, and then entered a valley stretching north, and camped at a stockaded village called Mpoko. The villagers were very suspicious at first, and shut the gate of the stockade, but ere long they came out to see us. Next day we reached Chiwinda's village, a few miles south of Mount Lireche, the most prominent hill in the district. Chiwinda is a well-known and influential chief. He received us politely, but I had not much talk with him. He possesses cattle and sheep and goats in considerable numbers. The soil here in parts is very good, but most of it is poor. The natives cut down branches of trees and collect them in a large heap, perhaps two feet high and extending over half an acre. This they burn, and then hoe the ashes into the soil for their gardens. The trees are thus all pollarded, as mentioned by Livingstone. The lower three or four feet of the trees are blackened stumps, while the upper branches are fresh and green. Chiwinda's village is on the Songwe river, which I followed for two days more. It flows to Nyassa. Upwards the valley trends north-west, flanked on the west by a straight range called the Awiwa hills. In the south, near Chiwinda, they are high and well defined; in the north the range slopes down and merges into a high plateau, which I had to cross. On the east side of the valley the hills are irregular and, excepting Mount Lireche, are of small size.

On October 25th I left the Songwe valley, which is occupied throughout its entire length by the Chungu tribe, and ascended to a higher plateau, the edge of which is a continuation of the Awiwa range. I found the Bachungu everywhere well disposed. In the hills they clothe themselves decently, and cloth is pretty abundant among them.

The next day's march brought me to villages of the Anyamanga tribe. Chikanamlira is the principal chief. At his village I came on the track of Mr. Thomson, and thence followed him to Tanganyika, overtaking him rapidly. At Miluma I heard that the emissaries of Mapunda, Kasanga, and Mpanga, chiefs near Livingstonia, had been among the Babemba tribes to the south, and had prompted them to make a foray against the Anyamanga. Miluma's village and four others were broken into, and women and children enslaved. These Babemba are the disturbers of the peace in this district. They occupy the country three or four days' march to the south of Chikanamlira's. Mtuka, otherwise Chitimkuru, is their principal chief just now. Three years ago he got a decided repulse at Chikanamlira and also at Mambwe, but he is still the terror of the country.

On the 28th of October we camped by stream Mera, which flows southwards to the Chosi, and then joins the Chambeze river. This stream may be regarded as one of the most remote of the head-waters of the Congo.

On the 30th we reached the head village of Mambwe. In the evening the chief came to see me. I put him down at first as a Swahili, but afterwards found that he was a native of the district. He is a young man of about twenty years, intelligent and quick, very inquisitive, and a great beggar. He was dressed in Arab fashion from head to foot in clean, fine cloth, and though young has quite the bearing of a chief. I gave him a good present, but he did not feel inclined to show his friendship by giving one in return, though he was in our hearing prompted to do so by some women. He is very nervous, and felt by no means at his ease when at his request I showed him my guns. Opening the breech or a click of the locks was a signal for a start, and he nearly ran off when he saw a rifle loaded in a second or two. His own name is Nsokolo, but he is usually called Mwini Mambwe, or Chief Mambwe. His father, lately dead, was the first of his dynasty. He had long been in league with the Mangone, while they dwelt among the Fipa Mountains, by whose aid he was able to keep the Babemba in check. I here got some further notes of the history of the Mangone tribe. A few years ago (the exact time I could not arrive at), they dwelt at Fipa, which is described as being a beautiful and fertile country. Then the tribe or tribes, which are now broken up and separate, lived together. Pisani seems to have been the most powerful chief. Under him were Chipatula (the old man, not the present), Mombera and his brothers, Mperembe, Chiwere, Tabeni, and the Gangwara tribe. Mperembe quarrelled with Tabeni, but was beaten by the latter, who then with his retainers went north along the west side of Lake Tanganyika, where he is now peaceably settled. Pisani and his followers then attacked the Babemba, and for a time were victorious, but ultimately were driven back. They all then went to the present Gangwara country, when the Gangwaras detached themselves and drove the others back. Then Pisani went south to the Rikuru valley, and ultimately to the Kasitu valley. Mperembe and Pisani then quarrelled. Pisani and Chiwere went further south and settled; Pisani to the west, and Chiwere to the south-west of Kota-Kota, where they still are. Mperembe made a second raid against the Babemba, and was assisted by Mambwe. He was soon driven back, and is again settled in the Kasitu valley near Mombera. It is said that this assistance given by Mambwe is the ground of the present enmity of the Babemba. The people of Mambwe say that they would welcome Mperembe among them again, as he treated them better than the Babemba now do. It has been this system of family quarrels and internecine war that has sapped the power of the Mangone tribe.

On November 3rd, after ascending for two miles, we began the descent to Lake Tanganyika. The district I passed through between October 21st and November 3rd, may be described in a few words. Four marches led through the open valley of the Songwe, and then the road passed on to a high level plateau, across which I could see hills over Lake Tanganyika. Mambwe's country, and especially Chirundumusia's village, occupies the highest part of it, and from many points a most extensive view is obtained. In many places the soil is very good, especially on the Tanganyika side. I have no doubt that many European food plants would grow. The average elevation is about 4700 feet above sea-level. The rainfall, I was told, is large, and, as I found, began a month earlier than on Lake Nyassa. The climate is cool and bracing, and I have no doubt healthy. Cattle I found at almost every village, and sheep and goats are kept in large numbers. The tsetse fly, that insignificant yet most formidable enemy, is not found anywhere between the shores of Lake Nyassa and the last stage before reaching Lake Tanganyika, though on the shores of the latter lake they are very numerous. The route through the country that I followed is a remarkably easy one. It gradually rose from 3900 feet at Maliwandu's to 5400 feet at the ridge overlooking Tanganyika, and throughout the whole of it there is not one difficult ascent. Undulations of course there are, but they will be no obstacle to the construction of a road. Water is plentiful even in the dry weather. Good timber is, however, scarce, and this is the greatest drawback to the country. I may here say that I have quite failed to see the fine forests described by some travellers. The whole country is indeed tree clad, but large trees are conspicuous by their absence.

The inhabitants of this district are to all appearance a peaceable and industrious people. As they told me, they desire only to cultivate their gardens and to work their iron. All the way between the basins of the two lakes I found traces of ironstone, and in places old workings. On one hillside in Mambwe I counted eight smelting kilns in good order, within a few hundred yards of each other, and doubtless there were many more. These kilns are larger than those used by the Ajawa and Manganja. They stand about nine feet high, are five feet in diameter at the base and three feet at the top, and are built of clay plaster four or six inches thick. They will contain nearly half a ton of iron ore. Charcoal is used for smelting. The description of ore is the brown hæmatite; it is very hard and compact, and is found in solid beds of four or five feet thick. I found one small piece of coal not very far from Maliwandu's, but failed to discover it *in situ.*

Near Maliwandu's, at the end of November, the trees were thickly covered with large caterpillars, three or four inches long, and as thick as the forefinger. The natives were gathering them in great numbers. They disembowel and roast them, and preserve them for food. One kind is of a light pea-green colour, the other dark, with white spots and sharp spines on the back.

The descent to Lake Tanganyika occupied two days only. The first day we passed villages of Masumba, Mpembe, and Chikomangombe, and camped at Zombe. Descent was gradual and generally smooth. Walking was quite easy. I did not see Zombe; he was absent from his village, but I left him a present. I noticed here three human skulls, stuck as trophies on the stockade over the principal entrance.

On the 1st, 2nd, and 3rd of November we had heavy rain in the afternoons.

November 4th.—After a descent, generally easy, of 2100 feet in 14 miles, we at last reached the shore of Lake Tanganyika, after a march of 243 miles in seventeen days from Lake Nyassa. My first view of the lake was by no means an attractive one. It will be remembered that Mr. Stanley, in his last visit to Ujiji, found that since his previous visit the waters had risen considerably. There is evidence of this at the southern end of the lake also. The lake shore for miles is fringed by a belt of dead trees; many of them are still standing, and are swayed to and fro by the wind and waves, while others, fallen and waterlogged, are beat and broken by the restless sea. The decaying vegetable matter pollutes the water, which is dirty and insipid. The account of the rise of the lake is as follows:—Four years after Dr. Livingstone's visit in 1869, the waters rose in one rainy season to a point where my camp was pitched in Pambete, or about nine feet above the level of November 6th, 1879. In the dry season it fell, but not to its original level; and every rainy season since, it has risen to a point some 2 feet 6 inches lower than the maximum, or 6 feet 6 inches above the level when I saw it, according to evident marks on the trees. Large trees, still erect though dead, are standing in three or four feet of water 200 or 300 yards from the shore, on what must quite recently have been dry land. The waters have thus gained at least ten feet on the land within the last few years, not reckoning the first high flood. When I saw the lake, however, the waters had doubtless already begun to subside. I am anxious now to learn if during the last rains the waters attained to a height at all comparable to that of the preceding three or four years.

I first touched the lake shore at the southern end of the most easterly bay. The next day I crossed Molitonga Cape, River Lonzua, and Cape Chikala, and reached Pambete. The total distance from the Kambwe lagoon on Lake Nyassa proved to be 254 miles, inclusive of windings. At Pambete I had the pleasure of meeting Mr. Thomson, of the Royal Geographical Society's expedition. He had arrived only the day before, and was much surprised to find a fellow-countryman walk in upon him. He had not heard of my approach until I was in the village, though I had heard from the natives, days before, that he knew of my coming and was expecting me. I have heard Mr. Thomson, in describing our meeting, speak of me as that "ubiquitous individual, a travelling Scotchman." I do not know what I have done to deserve such hard names, and think I am quite justified in using the retort "tu quoque."

The next four days were pleasantly occupied in comparing notes with Mr. Thomson and hearing about the country and tribes that he had passed through. I was delighted with the success that had attended his bold resolve to push on, and carry out the objects of the expedition; that notwithstanding the death of his friend and leader, he had succeeded in conducting the whole of the caravan to the shores of Lake Tanganyika. Since returning to this country I have already had an opportunity of congratulating him on the termination of his work.

These days were spent with Mr. Thomson, and the nights in great measure with my sextant and note-book. After a good deal of labour, I at last succeeded in taking a set of lunar observations, which satisfied myself at the time, and on the accuracy of which I had the pleasure of being complimented by Mr. Coles after my return to this country. The result of these observations is to fix the longitude of Pambete at 31° 21′ 20″ E. This result is a very good mean between the positions assigned to Pambete by Messrs. Stanley and Thomson, and may, I believe, be accepted as approximately accurate. I was also able to verify the height of Lake Tanganyika as fixed by Dr. Livingstone, at 2624 feet above sea-level.

My maps of the district now described, were published in this Society's 'Proceedings' of July 1880, in which was also represented a section of the route I traversed between the two lakes.

My return journey to Lake Nyassa was uninteresting. It was saddened by the death of one of my men, and by the illness of several more. On the 3rd of December, or two days after the time appointed, I again reached the shores of Lake Nyassa at the Kambwe lagoon. The total distance traversed between the two lakes I found to be, as measured by pedometer, 243 miles on the outward journey, and on the homeward journey 222 miles.

I believe I need hardly inform this Society that my object in making this journey was not solely the interests of geographical knowledge.

Two years ago the chairman of this Society said, "Much doubt still existed as to the exact longitudinal direction of the Lakes Tanganyika and Nyassa, and the width and nature of the intervening land between the northern end of the one and the southern end of the other. In connection with the idea of forming a line of communication, chiefly by water, between the mouth of the Zambesi and the Victoria Nyanza, and so to the Nile, it was naturally important, in view of the portage here required, to ascertain whether there was a wider or a narrower belt of country between Tanganyika and Nyassa. A great deal depended upon whether the northern part of Nyassa lay a little more to the east or to the west. If, as had been contended, Nyassa at its northern end approached a good deal nearer to the southern extremity of Tanganyika than was formerly supposed, the difficulty of communication between the two would be materially diminished."

This geographical problem the Society had even at that time taken steps to solve, by organising their East African expedition. Whilst in Africa my thoughts also had been directed to this question, and the consequence was, that in the end of 1879 I was engaged in friendly rivalry with the Society's expedition, as to who should have the honour of solving the question. If Mr. Thomson beat me in the race by a day, I can at least lay claim to having achieved the practical result, in fixing the positions of the north end of Lake Nyassa and the south end of Lake Tanganyika, and in discovering the practicable route between them. I went with the distinct purpose of surveying the route, in order to report on the feasibility of constructing a road between the two lakes. My description of the country will have prepared you to learn that I have reported in favour of such a scheme, and have recommended that it be carried out. There are some men in Glasgow who for several years back have been anxious to receive such a report, and who are willing to carry out the work. The scheme which appears most practical and practicable to them is the following. It requires that three separate associations combine their energies to do the work, and thereafter make it serviceable in the cause of Christianity and civilisation. First (and on this first all the rest depends), that the London Missionary Society will adopt permanently for the future, the Shiré and Nyassa route to their mission field of operations on Lake Tanganyika. Second, that before long, they send out to Lake Tanganyika a steamer, and that they maintain a station, say at Mambwe, on the line of road between the lakes. Third, that the Free Church Livingstonia Mission establishes and maintains a station, say at Maliwandu on the same road; and fourth, that the Livingstonia Central Africa Trading Company extends and develops its mercantile operations as far as to Lake Tanganyika.

One gentleman in Glasgow has formulated these conditions and has offered, if they be accepted, to provide for the expense of constructing the whole road. This gentleman, Mr. James Stevenson, a member of the Royal Geographical Society, has offered to provide no less than 4000*l*. for this work, 3000*l*. of which is a free gift. The Free Church and the Trading Company have already signified their acceptance of those terms, and their readiness to do the portion of the work that lies to their hands. The question is still pending with the London Missionary Society. I sincerely hope that they will see their way to the adoption of this route, which I am convinced would be of great advantage to their mission, and of unspeakable advantage to the country.

The actual execution of this work will likely fall to me. I have the prospect before me of shortly returning to Africa with a couple of artisans, to commence the construction of the road, and the building of our station at Maliwandu. The work will doubtless occupy me at least two years. The construction of it alone will act as a powerful civilising agency. It will accustom the people to the use of calico and other European articles, and when the time comes for the London Missionary Society's steamer to be transported over it, there will be a sufficient body of trained workmen in the neighbourhood to undertake its carriage. I have already said that the first 40 or 50 miles alone present any difficulty of construction. Considerable excavation in sidelong ground, and breaking and removal of rocks will be necessary, but throughout the rest of the way there will be little trouble. When the work is done, or at least well advanced, the transport of the steamer will cause us little anxiety. By means of our present steamers and barges, and with the help very likely of Jumbe's dhows from Kota-Kota, the pieces of the steamer will be conveyed from Quillimane to the north end of Lake Nyassa; for I need not say that though the steamer will belong to a different Missionary Society, we of Livingstonia will be delighted to render them every assistance in our power.

This steamer then will not require to be put together for any portion of the journey. It will be built for the first time, and once for all, on the shores of Lake Tanganyika, and once there it will command the navigation of the whole of that magnificent lake for 400 miles to the north. This will be the completion of the water route to the lake region, a route of fully 1400 miles in a nearly straight line, with only 275 miles of land carriage throughout the whole of it. It begins on the sea-coast at the Kongoni mouth of the Zambesi river, thence by the Zambesi and Shiré rivers the navigation is open as far as to the Murchison Cataracts, or 300 miles from the coast. There the water route is broken, but a road of 65 miles in length has already been made to overcome the obstruction, and which with a very little more expenditure could be made fit for waggon traffic. The difficulty here will never be overcome by a canal. The total fall is about 1200 feet, and the cost of such a canal, if it ever should be made, would be not much less than a million sterling. It would be much cheaper to carry the traffic by road in perpetuity for nothing, than to make such a canal. Above the Murchison Cataracts communication is open to the north end of Nyassa, or 800 miles from the sea. So far the work has already been successfully done. To link on to this route the whole length of Lake Tanganyika is my object now, and to divert the commerce of that lake into the line that we have opened up, and so throw work into the hands of those whom we are educating and civilising.

The completion of this work has been my dream since I went to Africa. It has also been in Mr. Stevenson's mind for doubtless a much longer time. Having set his hand to the work, he is not the man to let it lag long in execution. I trust that he or his representative will within three years be able to announce to this Society the completion of this great work.

On the conclusion of the above,

The CHAIRMAN (Sir Rutherford Alcock) said they had all listened with very great interest to Mr. Stewart's practical and instructive paper. The author had made a humorous reference to his fellow-traveller's allusion to him as "that ubiquitous individual, a travelling Scotchman," retorting the *tu quoque;* but many would wish to have deserved and obtained the honour of such work as had been accomplished by the two travelling Scotchmen in question. He hoped they would hear much more of and from them yet, for friendly rivalry, such as they had shown, would always be to the advantage of civilisation and progress.

Mr. HORE said he had spent nearly four years in Central Africa, the principal part of that time on the shores of Tanganyika. On first going out to Africa in connection with the pioneer expedition of the London Missionary Society, his time was to be especially devoted to geographical work; but owing to the death or return of most of his comrades, the whole of the mission work ultimately fell on his shoulders. He was therefore unable to devote much time to the specially geographical part of the work. However, he hoped before long to be able to put together such information as he had gathered into an intelligible form, and to read a paper which he hoped might be interesting to the Society. The river Lukuga had been referred to—first discovered by Lieutenant Cameron in his journey across Africa. Lieutenant Cameron reported that there was a slight trickling of the waters of the Tanganyika through the Lukuga creek, which could scarcely be then called a river. Mr. Stanley, however, who was the next to make observations in that locality, pronounced that it would eventually become the veritable outlet of Lake Tanganyika. Two years afterwards on his (Mr. Hore's) arrival at Ujiji, he was informed that the waters of the lake had already broken through the barrier observed by Stanley, in exact accordance with his prediction to that effect. He accordingly lost no time in making his way to this, the most interesting spot on the Tanganyika shores. He steered, of course, for Lieutenant Cameron's Lukuga, and found the entrance exactly as it was indicated. Steering into the river, he found himself quite helpless to control the movements of his boat. His men were panic-stricken, and the boat was swept into the river at the rate of eight or nine miles an hour, plainly indicating that this was an outlet of the Tanganyika. The boat was carried at least a mile into the river before he succeeded in bringing her to shore; and it took him three days to get out of the river again. He was then perfectly satisfied that that was really the outlet of Lake Tanganyika. Mr. Thomson had the honour of tracing that river further westward. With regard to the possible action of the London Missionary Society, as referred to by the author of the paper, he was not able to give them much information, not being on this occasion the representative of the Society; he could, however, assure them that they would not be behindhand in any schemes for opening up Africa. The directors would shortly consider this matter very seriously; they would look at it fairly in all its bearings, both with regard to its general importance in the opening up of the continent, and especially as a route for the conveyance of their goods. He hoped that ere long the London Missionary Society would be able to combine with the other efforts as to which they had received information that evening, so that they might be strong in unity in this great work in Africa.

The CHAIRMAN said it was a question which would be the best line of route to the lakes—that which Mr. Thomson traversed, from the sea-coast at Dar-es-Salaam, or that by the Shiré river and the Zambesi, the route advocated by the Free Church Missionary Society. By the latter route there was no doubt the advantage that they had at once water-carriage from the entrance, with only some 65 miles of portage, which was already under the control of the Mission on Lake Nyassa, and no doubt would be made a very practicable road. The other 220 miles between Nyassa and Tanganyika would have to be traversed in any case. If the Missionary Societies, with the aid of that munificent promoter of African exploration and civilisation, Mr. Stevenson, should really determine upon that route, there was no doubt there would then be a magnificent line of communication from the Zambesi to the northern end of Lake Tanganyika, extending over upwards of 1400 miles, with only some 270 miles of practicable land route. With regard to the Lukuga, he thought it was perfectly settled that that is an outlet of Lake Tanganyika, and an outlet under certain circumstances with a very powerful current and a great body of water. He would ask Mr. Thomson, who was present, to give them his experiences with regard to that river.

Mr. Thomson said with regard to the journey from Lake Nyassa to Tanganyika, there had been nothing of the nature of a race between him and Mr. Stewart, or if so it was a one-sided race, for although Mr. Stewart knew that he was in front of him, he (Mr. Thomson) certainly did not know Mr. Stewart was behind. Mr. Stewart had referred to his (Mr. Thomson's) views regarding the Konde Mountains. He did not object to the name Konde, but he did object to calling them a mountain range. It was altogether an illusion. Sailing up the lake Mr. Stewart saw what appeared to be a range of mountains rising rapidly up to 4000 or 5000 feet, and he assumed that on the other side there was a slope of somewhat equal extent. That was not the case. Following the plateau from the east towards Lake Nyassa they would find that it rose to 6000, 7000, or 8000 feet, and then appeared as an escarpment or edge round Nyassa, but there was certainly nothing like a range of mountains; the land rises abruptly to a great height from the side of the lake and presents the appearance of a range, but that is simply an optical illusion. He could verify Mr. Stewart's remarks about the country between Nyassa and Tanganyika. His experience of the chief of Mambwe was exactly like Mr. Stewart's. He did not bear himself like a chief in any respect. He showed him his guns as Mr. Stewart did, and found that they had the same effect. With regard to the Lukuga, he believed that, at any rate since the Arabs arrived at Ujiji, no outlet had existed until within the last three or four years. Captain Burton arrived there (and no man was better able to collect information) and described routes which crossed the present channel of the Lukuga to Urua, and yet he never mentioned its name. Dr. Livingstone arrived there and passed the very mouth of the Lukuga, camping close to it, and yet he heard nothing of it. Neither of these travellers mentions any alteration in the level of the lake. When Lieutenant Cameron arrived at Ujiji he heard from the Arabs that such a place as the Lukuga existed, and in passing down the east side of the lake his boatman pointed out the place and described it as the outlet. He sailed round the south end of Tanganyika, up the west side, and arrived at the Lukuga. He found it to be a long creek, and trying to ascend it came to what appeared to be a barrier of weeds; he saw some straws drifting towards the barrier, and immediately concluded that there was a current, and without further examination threw up his cap and declared the drainage problem solved. In another year Stanley arrived at Ujiji and heard a different account from the Arabs. They told him that there was no such thing as an outlet called the Lukuga; there might be a place called Lukuga, but no river or outlet. Hearing that Cameron had described it as the outlet of the lake, he determined to examine it carefully, and his account was that no outlet then existed. He was fully convinced that Stanley gave a most correct account of the Lukuga as he then found it, and that there was really a barrier existing at that time. But they both noticed that the lake was rising, and about a year after Stanley's visit it rose very rapidly according to all accounts, and swept away the barrier. The lake had now fallen some 8 or 10 feet, and the volume of water flowing out was gradually becoming less. He (Mr. Thomson) noticed a difference in two months in the volume of water flowing out, and a sill was then beginning to form at the mouth of the Lukuga. His view of the origin of the Lukuga was this: that in ordinary seasons evaporation and rainfall balanced each other, but that during some years there might be an excess of evaporation, which was a very likely thing to happen in such a country, and consequently the lake would fall in level. This clearly accounts for the intermittent character of the drainage. There had been a period of very dry seasons, probably before this century, in which the level of the lake was lowered, so that no water went out by the Lukuga. Gradually a change took place; the rainfall became more abundant, and the water gradually rose until the barrier was swept away and an outlet once more formed for the surplus water of the lake as they now had it. That seemed to be the most reasonable theory that could be formed of its origin. Mr. Hore had suggested that the earthquakes with which he had become familiar at Ujiji might have had something to do with it; but he thought it would hardly be established that a small district on one side of the lake had been raised or lowered in that manner. He wished to express the pleasure with which he had listened to Mr. Stewart. Curiously enough, they met in London exactly on the anniversary of the day on which they met at Lake Tanganyika, he not knowing that Mr. Stewart had then left Africa. They were both about to proceed again to that country, and he hoped they might once more meet in Central Africa.

Sir Fowell Buxton said that for the last three or four years attention had been drawn very strongly to the line of road which had now been indicated. The prospect of uniting Nyassa by road with Tanganyika, afforded undoubtedly the best prospect of commercial access to the interior of Africa. It was the case that when much less was known about that route, and the difficulties of the rapids on the Shiré, and the difficulties of navigating the Nyassa were more manifest to them, it did appear to some that an advantage would be gained by endeavouring to open means of reaching the north end of the Nyassa. Mr. Stewart had already alluded to Glasgow men: one of them, Mr. Mackinnon, and others, endeavoured to construct a road from Dar-es-Salaam in that direction, 75 miles of which was completed. It was now a question whether, until we obtain increased knowledge of the geography of these parts, it would be best to continue that road further. So far as it had gone it had penetrated the more unhealthy and difficult part adjoining the coast, and had reached a higher point where possibly the climate was better, and the country more level and less swampy. For the present any operations in that direction had been brought to an end, and it was possible that with the greater means of access that had been indicated that evening, it might be better for a while that nothing more should be done in that direction. He felt very great interest in what they had heard concerning the outlet of Lake Tanganyika, and hoped that travellers who had been there and who perhaps would find themselves there again, would endeavour to obtain still further information which might tend to the elucidation of that problem. It must have been very astonishing to residents in those parts to find that torrent suddenly descending upon them, and probably some traditions of their feelings on the occasion would be an indication of its suddenness and unexpectedness. He could not but hope that those who were proposing to go there again would endeavour to obtain some information upon it and possibly to throw light upon what might prove to be a very curious geological phenomenon.

The Rev. **Horace Waller** said there was one subject connected with the paper which they must steadily bear in mind, and that was Portuguese obstruction, against which Livingstone and others had so often done battle. He was, however, thankful to say that better counsels had prevailed of late years, and that the Portuguese had now opened the rivers. At that present moment the Chambers of Lisbon were sorely exercised on this very subject of using these rivers and extending civilisation to the interior of Africa from the Portuguese seaboard. He thought this was an exceedingly happy moment to recognise the great advance which Portuguese good fellowship had made in contributing to ease the burden which formerly rested on travellers and on explorers. In times gone by, he had felt it his duty to point out as vigorously as he could that the great barrier was Portuguese disinclination to Englishmen opening up that country; but now that it was removed, he could only hope that this energy ready to spring forward and vouched for by Mr. Stewart, would be spoken of very opportunely in Lisbon and justify those ministers who at present were most anxious to add to what had been done within the last two or three years, and literally to open up Africa to them with good fellowship. He was glad to see Sir Fowell Buxton present, because he had a message to him from his coadjutor in making the Dar-es-Salaam road. Dr. Kirk had recently been over 40 miles of the road made by Sir Fowell Buxton and Mr. Mackinnon, and having had the pleasure of our excellent consul's acquaintance for many years, and monthly correspondence with him, he did not know that he had ever known him write so forcibly about anything as he had about this very road. He said now that he had been over it, he was astonished at its extraordinary effect upon the people; that formerly no man could have gone over those 40 miles without a very strongly armed retinue, but now any man could pass there without any weapon at all. Civilisation was extending in a marvellous way, the land was cultivated on each side, and as a philanthropic object it was successful to the last degree. This augured very favourably for this projected road between the two lakes, which would not only do all that Mr. Stewart and Mr. Thomson, and others who had been there believed, but a great deal more; for when the natives saw peaceably disposed, earnest men passing to and fro, all their prejudices would be melted down and all hearts opened towards them. A tribute of gratitude was due to Mr. Stevenson. Mr. Stevenson crossed swords right manfully with one or two of them over this geographical problem some years ago, and it was ultimately admitted that he had pushed the Nyassa too near to Lake Tanganyika. But how nobly had he atoned for that mistake! He had offered literally to pave the odd miles with gold, and it was by such splendid benefactions as this that Africa had been opened out. Mr. Thomson had rather cooled them down for a little time by stating that he had not found any great store of iron in that country. He was very glad to hear what Mr. Stewart had said upon that subject, because although it might be looking ahead a little too far, the day might come when they would want railways there. He hoped when they had had the great advantage of Mr. Thomson's further skilled exploration, they would find that he had come across large beds of iron. As possibly there might be some embryo explorers present, he wished to emphasise one thing which Mr. Stewart had said, namely, that for 35*l.* a month he travelled in that part of Africa. Let the Geographical Society think of that, after what they had spent in times gone by! He was sure the good men who were already on Lake Nyassa would welcome any further explorers. There was Lake Bangweolo to the west. Why not go to Livingstonia and fit out expeditions, headed by such fine fellows as old Chimlolo to go out there? He believed there would not be the slightest trouble about it, and two or three successful explorations of this kind would be of very great advantage.

Notes on the Chugáni and neighbouring Tribes of Kafiristan.[*]

By Colonel H. C. Tanner.

(Read at the Evening Meeting, April 11th, 1881.)

Map, p. 320.

As I am the only Englishman who has ever visited the Dara Nur and the country to the north, I think my notes of the people and the tract they occupy may perhaps be interesting; I therefore send you the following account of the Dara Nuri and the Chugáni, and a note or two about the Kafirs. Much of the information is new; my own personal

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[*] This account of his recent visit to the Chugáni country was communicated by Colonel Tanner to Mr. R. N. Cust, who read the paper to the Society, accompanied by the following prefatory remarks:—

The population of Kafiristan may perhaps amount to 100,000. They are entirely independent of the Amir of Kabul, as they have been of all Mahommedan rulers. The country is said to be called "Wamastan" by the natives. It is impregnable, and occupies a commanding position, domineering all mountain passes between the Oxus and Indus basins. It occupies the most western part of the independent Highlands, or Yaghistan, just where the chain of the Hindu Kush impinges on the extremity of the Himalaya. It caps the mountainous region of Badakhshan on the Oxus, and overlooks most of the passes at the head of the Kabul river. The people are ethnically distinct from the Afghan, Hazára, and Tajik populations.

Mountstuart Elphinstone, in his account of the kingdom of Kabul, in 1815, notices the existence of the Kafirs. He had neither visited them nor seen more than one of their tribe; he knew their geographical situation only vaguely, and little of their history. He notes that they were Pagan, neither Hindu nor Mahommedan nor Buddhist, in constant hostility to the Mahommedans, and that their numerous languages had all a near connection with Sanskrit, or, in other words, were of the Indian branch of the Aryan family. He mentions their fair complexion, and hazards, with great show of truth, the suggestion that the Kohistáni, Laghmáni or Dehgáni were of the same tribe ethnically, and the same family linguistically, though they had become Mahommedan. He remarks that there is no name for the nation, and that each valley was held by a separate tribe, one of whom were called Siah Posh or Tor, from their black dress, and another Spin, from their white dress. They were wild mountaineers, but were agriculturists as well as pastoral, and far from being in a low, though a rude, state of civilisation, as they dwelt in houses, and had laws of marriage. They had many slaves, and it is specially remarked, that these were not Mahommedans, and that slavery was not cruel, but of the domestic type. He alludes to the absurd tradition that they were descendants of Macedonian soldiers left there two thousand years ago by Alexander the Great on his celebrated invasion of India. They ate the flesh of the cow, deposited their dead in coffins under the trees, and had a form of Nature-worship; in which particulars they resembled the non-Aryan races of India.

Twenty-five years later, Sir Alexander Burnes had opportunities of giving further information with regard to the Kafirs, in his 'Personal Narrative of a Journey to Kabul' (1843). He had at Kabul met many of the tribe, who had been enslaved by the Mahommedans but still remembered the language and customs of adventures during my exploration I think it better to omit from these pages.

The valley of Dara Nur, which I could never satisfy myself was called Dara-i-Nur (being generally called simply Nur by the inhabitants), is the basin of a river, which rises on the south face of Kund and flows

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their country. He met persons, Hindu and Mahommedan, who had visited Kafiristan. He remarks, that they call themselves "Kafir," seeing no offence in the word, and looked upon all men as brothers who wore ringlets and drank wine; that grapes were in abundance in their valleys; that their appearance was totally distinct from Afghan or Kashmiri; that Mahommedans get no quarter, and never enter the country. That Hindus went as merchants and mendicants; that they sacrificed corn to their idols, and ate beef; eating their food in companies, sitting upon stools. A short vocabulary of words spoken is given, and the opinion expressed that they show an affinity to the Hindu language. Some of the people of Kohistan spoke a dialect resembling that of the Kafirs.

The Kafirs are noticed by Wood, Vigne, Wolfe, Masson, Lumsden, Raverty, and Bellew, but the information is always at second-hand. Dr. Trumpp, of Munich, while he was at Peshawur, gathered from two Kafirs, who were brought to him, some knowledge of the language, which he published in the Journal of the Royal Asiatic Society. In 1874 two Protestant missionaries made an attempt at the risk of their lives to penetrate into Kafiristan, under the idea that Europeans would be welcomed there; but one of them was sent back by the Governor of Jalálabad, and the other was stopped by the English authorities on the frontier. In fact, no European has entered Kafiristan. Dr. Leitner has made some approaches and attempts to glean information on the side of Dárdistân, and now Colonel Tanner has availed himself of the late expedition into Northern Afghanistan to make a material contribution to existing knowledge.

Considerable interest was aroused by notices such as these, which appeared in the public prints:—

"It seems probable that a part, at least, of the mystery, which has so long shrouded Kafiristan, will be cleared away, for, as stated by Mr. Blanford in his address to the Asiatic Society of Bengal, Major Tanner has discovered, near Jalálabad, some relics of the old Kafir (pre-Mahommedan) rulers, and more particularly has found a subterranean palace, which has been already partially excavated. He has also made inquiries about those mysterious people the inhabitants of Kafiristan, and finds, that there are at least ten dialects of the Kafir language; of these dialects, which, as might be supposed, are Aryan, he is compiling a glossary. Having heard of a tribe called Chugáni, who can muster 6000 fighting men, and are neighbours of the Kafirs, he, by aid of his interpreter, succeeded in getting two of them to visit him. He describes them as wild, ragged fellows, of pale complexions and thin features, their legs clothed with coarse goat's-hair socks, then an outer covering of goat's hair, and curious untanned shoes tied on in a cunning fashion. They assured Major Tanner that his life would be safe in their own valley, and promised to repeat their visit and bring two Lal Kafirs. 'It is with the Chugáni,' writes the Major, 'that I must enter Kafiristan, if I do it at all. They are half Kafir themselves, and though professed Mussulmans, they seem to have their sympathies more with the hereditary enemies of their co-religionists than with the Mahommedans.'"

These latter remarks tally with what has been repeated from other quarters, that these Aryan mountaineers were divided into pagans, such as the Kafirs; Mahommedans, such as the Laghmáni and Kohistáni; and Nimchah, half and half, who south-east into the Kunar river. It has many villages and forts, and except at the upper end, where there are two villages of Chugáni, is inhabited entirely by the people whose vocabulary I send you. Some 10 miles from the source of the Dara Nur valley the Damench stream

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perhaps go as far as repeating the Mahommedan Kalám, but are in all other respects pagan.

Colonel Tanner started on his most enterprising expedition into Kafiristan alone. He accepted the invitation of certain influential Kafirs to visit them as a guest, and it was believed, and the result proved, that their faith could be relied on. They give no quarter to Mahommedans, but spare those, who like themselves are technically Kafir, or non-believers in the creed of Mahomet, which was associated in their minds with barbarous cruelty from the earliest period of the Mahommedan invasion of Afghanistan. His progress was watched with great interest, and the Royal Geographical Society, in its 'Proceedings' of 1879, pages 514 and 713, kept its readers informed as to his movements, as far as private and hasty letters permitted.

Captain Holdich, in his paper on the "Geographical Results of the Afghan Campaign,' read before the Society December 13th, 1880, and published in 'Proceedings' of February 1881, page 74, notices briefly the failure of all attempts up to the present date to enter Kafiristan, as much on account of the fierce and jealous tribes which surround it, as to its own geographical position and inaccessibility. He testifies that though pushed back by the encroachments of a more powerful, because more civilised, people, and diminished in numbers by secession to Mahommedanism, the Kafirs still in the remotest possible peaks of the Hindu Kush maintain something of a national existence. It is doubtful, whether they are spread over the watershed of that range, and the weight of evidence seems against that fact, though Elphinstone's map so delineates them; but unquestionably the tribes to the south are of the same stock, such as the Nimchah, Sâfi, Dehgáni, Laghmáni on the immediate skirts, and more remotely the Kohistáni, who have all really or nominally accepted Mahommedanism for the sake of peace and respectability.

Major Biddulph, the Political Agent at Gilgit, in his volume on the 'Tribes of the Hindoo Koosh,' printed at Calcutta, 1880, makes important additions to our knowledge. During his stay at Chitral, 1878, two deputations of Siah Posh Kafirs came to visit him, and invited him to their country, but he was unable to go. He had seen and conversed with Kafirs, and with men who had visited Kafiristan, and learnt that the population is composed of a number of tribes, speaking a diversity of languages, though without doubt of cognate origin, and having similar customs and religion. Many of them are unable to understand each other, and they carry on intertribal warfare. From the force of circumstances, these Aryan tribes are still in the primitive state in which they were before the Christian era.

There are three main tribes, conforming to the natural divisions of the country.

I. Rumgáli or Lumgáli, who occupy the upper parts of the valleys which run down in a south-west direction; this tribe also extends to the north side of the watershed. The people of Laghmán are probably of this stock, but now Mahommedans.
II. Waigáli, who occupy the valleys which run south-east, joining the Kunar valley at Chaghan Serai.
III. Bushgáli, who occupy the valleys extending from further north in a south-easterly direction.

These main divisions are again subdivided into clans.

It was a great disappointment to all interested in these survivals of an ancient enters it, but the waters of the two never meet. They flow side by side about three-fourths of a mile apart for about 12 miles, and empty themselves into the Kunar river near Islámabad by different mouths, each torrent hugging closely the foot of the hills at its own side of the valley. Now, except in countries where terracing has been practised continuously for thousands of years, such unnatural topography as exists in Dara Nur, is next to impossible. The forces which were sufficient to scoop out the Dara Nur valley, in the first instance, would have kept a waterway at the lowest part, into which would have poured the drainage of the surrounding mountains; but in the Dara Nur long-continued terracing has gradually raised the centre of the valley high above the edges. The population has increased to its maximum limit, and every available inch of ground is required for cultivation; and the people, by means of terrace-walls built of ponderous boulders in the bed of the original single stream, have little by little pushed the waters out of their true course, until they run, where they are now found, in deep rocky cuttings at the very foot of the hills on either side.

The same strange spectacle of a valley containing two almost parallel streams, may be witnessed west of Jalálabad also, where the Kambu and Surkhab rivers are separated by a high artificial ridge. The waters of these two streams, highly charged with silt, have been for so many ages conducted over the terraced fields in the neighbourhood of Sultánpur Páin and to the eastward, that the surface of the cultivated tract between them has been very much raised above its original level, so that the Kambu and the Surkhab, which, if left alone, should join near Rosabad, are now strangers to each other. Sultánpur Páin, which once stood on a considerable eminence commanding the surrounding country, is now barely as high as the adjacent terraced fields, which have been gradually raised by the constant accumulation of silt. Above Sultánpur Páin there is a famous spring, venerated by Mahommedans and Hindus alike, whose clear waters are conducted on both sides of the town, and as it has not been possible for silt to rest where clear water runs, the beds of the stream have always remained in their natural channel, now two ravines or valleys, deep down below the level of the terraced tracts.

and unmixed race, representing the probable type of the old Aryan forefathers (from whom the great conquering races of the world, Indian, Iranian, Slavonic, Teutonic, Greek, Latin, and Keltic, have in remote ages descended), to receive the news, that Colonel Tanner was obliged to abandon his expedition, favourably commenced, on account of ill-health; however, a man of his stamp and varied acquirements and experiences did not do what he did in vain, for he played to advantage the part of "a chiel taking notes," and was good enough to forward to me the result in the shape of these interesting notes, which I have the pleasure of communicating to the Society. The purely philological portion of Colonel Tanner's letter I have reserved for the perusal of my friend Professor Trumpp, of Munich, the only person who has a scientific knowledge of the language, and it will eventually be embodied in a paper for the Royal Asiatic Society.

Throughout Ning Nahár,* where man has been for so many thousands of years at work, he has in many places completely altered the aspect of nature; besides separating the streams in Dara Nur, and at Sultánpur, by a high ridge of artificial terraces, he has forced some of the torrents that come down from the Safaid Koh to flow miles out of their true course, by continually building up his strong terrace-walls in the bed of the streams. For thousands of years his flocks of goats and sheep have been busy eradicating every trace of vegetation on the uncultivated tracts, until now there is not remaining a vestige of the original herbage except grass. The depredations of goats and sheep are visible up to about 7000 feet in the Safaid Koh, below which they have trodden away all the soil and eaten out every species of tree and shrub; vegetation in that range commences only at a point beyond which goats cannot reach in a day's grazing from the villages below. In the comparatively dry countries of Asia, where the soil throughout the year is not moist, and where the roots of growing grasses do not bind it together, goats and sheep have either killed or are fast killing the mountain slopes, and rendering them as dead as the barren islands in the Red Sea.

The Damench valley, which joins the Dara Nur, has a considerable number of villages. The inhabitants (Damench) have a language of their own, allied to but not understood by their neighbours the Chugáni and Dara Nuri. They are classed as Kohistáni by the Afghans, from whom they differ much in appearance.

The Dara Nuri profess to be Tajiks, and they take great pride in the antiquity of their race; but the Afghans speak contemptuously of their birth, and call them Dehgáns. The Dehgáns who live away from the mountains—for instance, in the Jalálabad plain—talk Pushtu, but it is not improbable that they once used the language of their brethren to the north of the Kabul river. They are probably the remains of the inhabitants who preceded the Pathans, and were Kafirs before Buddhism was introduced. That some of the existing tribes of Kafirs were once inhabitants of the Jalálabad plain is admitted by many Afghans and Dara Nuri, and Káma, Gamberi, and other tracts, were held in part by Kafirs till a comparatively recent time. Into the latter plain no less than two "Kafir Daras" empty themselves; and whilst I was at Jinjapur, in Dara Nur, I saw, at about a couple of miles distance, a Kafir village, with the walls still so perfect that I supposed it to be inhabited. To give some idea of the loss of area suffered by the Kafirs of late years, I may mention that, when they were driven out of Dara

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* The people of the Jalálabad plain and the adjoining country still recognise the ancient division of Ning Nahár, which they say means the nine streams. I could never exactly determine the nine rivers included, but all accounts agreed as to the following, viz. the Kabul, Kunar, Surkhab, Alingar, and Alishang. Some people gave me the minor feeders of the Kabul, which drain the Safaid Koh, such as the Chapriar, &c.

Nur, they found no resting-place until they reached the northern face of the Rám Kund range, at least four marches off in a direct line; but more of this further on.

The language of the Dara Nuri is almost identical with that of their neighbours on the plain of Laghmán. My list of words is very imperfect; I had intended to have made it complete, but when I learnt from the late Mr. Jenkins, who was killed with Major Cavagnari at Kabul, that he was engaged on the same language, I gave it up. Mr. Jenkins was an accomplished linguist, and he made a most complete grammar and vocabulary of Laghmáni; but from inquiries I have made I learn that all his papers were destroyed in the Bála Hissár, and I doubt if any copy of his Laghmáni studies reached England. I am on this account induced to send you the accompanying meagre list of words used by the people of Dara Nur.

In appearance the Dara Nuri differ little from the Afghans. Their features are softer, and they are more trustworthy and less given to fanatical outbreaks than the Pathans; and though in Dara Nur they continually fight amongst themselves, yet they have never given us trouble in Afghanistan. Government should make a recruiting-ground of their country, where there are hundreds of fine manly fellows who would be only too glad to join our army if sufficient inducements were held out.

The forts of Dara Nur are similar to those of the Jalálabad plain, and their interior arrangement is the same. In two, where I remained for several days, the women went about but little concerned at my presence, and showed far less anxiety than is exhibited by the Afghans to hide their faces.

In the room where I lived for some time, I was much struck by two carved wooden almiras from the Chugáni country, which contained all the family lungies and spare carpets, &c. The people still retain the custom of sitting on stools, and, as a rule, are not at home when squatting on the ground. Among the Kohistáni and Kafirs, stools are in general use, every house having sufficient numbers both for the family and for guests.

The climate of that part of the Kunar river about Shewa or Khewa (Kél of the Dara Nuri) is hot in summer, for it has an altitude of only 2000 feet, but the heads of the Nur and Damench valleys have sufficient altitude to give them a good climate. The scenery above Jinjapur is very fine; the lower slopes of the hills are not, as they are lower down, bare, and the spurs of Kund, high overhead, are clothed with a dense forest of pine and fir. Above the forests are lofty snow-peaks and craggy spurs. Backing Damench and the western feeders of the Nur Dara, and enclosing them as with an amphitheatre, there rises an enormous wall of granite, which connects Kashmund, 10,000 feet, with Kund, 14,000 feet. At the foot of this huge scarp lies a chaos of most mighty nodules of granite, and below the cliff, amongst the great masses of fallen rock, grow *Pinus excelsa* and oak, looking mere pigmies amongst the boulders.

But the description of the upper slopes of Kund pertains properly to the account I shall now give of the Chugáni tribe, who occupy the upper end of all the valleys that drain the Rám Kund mountains. Otherwise, I should like to go on and say a good deal more about boulders; and while I am about it I may as well mention one that lies back from a hamlet in Shulut, which is so big that there is a house built in a fault or crack running across its face. Another pebble lies athwart the village, and covers the whole of the houses from that side.

An account of the highly interesting people called the Chugáni, of their beautiful mountains and picturesque Kashmir-like valleys, of their costumes, their mode of life, and their language, would fill a volume were I sufficiently well acquainted with them; but as I was only a fortnight amongst them, and the greater part of that time ill with fever, the sketch I can give must needs be of the very slightest description.

As to locality, they live, as stated, in the highest habitable parts of the Kund range. To the south of them dwell the Damench tribe, and as the boundaries of their grazing-grounds march together, they live nearly always in a state of feud with each other. The east and the west of Chugánistan* are hedged in by the powerful race of Sáfi. They are the hereditary and inveterate enemies of the Chugáni, and peace is seldom known between them. At the time of harvest they observe an armed peace, but at all other times there is war. The Sáfi are the more numerous, and have richer and broader arable tracts than the Chugáni who have cultivated every available square yard of hillside that will bear a terrace-wall, and there is no room for an increase of population; but with the Sáfis it is different; the broader parts of their valleys are still to a certain extent capable of extended cultivation. The result is, that the Sáfi are gradually overpowering the Chugáni. Already are the villages of several of the valleys of Kund subject to the yoke of the Sáfi, and now the only really independent Chugáni are those who hold the head of Nur Dara, Shulut, and the head of the Mázár Dara, or Aret. The distribution of the tribe is here given:—

	Locality.	Name of Village.	No. of Houses.	
Drain into the Kunar river.	Nur Dara	Kandak	300	Call themselves the Aret Chugáni.
	”	Shemál	200	
	Shulut Dara	Shulut (4 villages) ..	200	
	Mázár Dara	Aret (and many hamlets)	1200	
	”	Sumásht	300	Aret Chugáni.
	Damench Dara	Sigal	400	
	Chowki Dara	Chilás	400	
	Pech Dara	Kordar or Chugali (and others)	100	Talk Dehgáni or Laghmáni.
Drain into Laghmán.	Pariana Dara	Pariana	1000	
	Chitalas Dara	Chitala	600	
		Total	4700	houses.

Or, say, 23,500 souls.

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* The Chugáni country is thus called by the Dara Nuri.

I was informed of others not named here who claim to be Chugáni, and who talk a separate language, but I could not ascertain the localities they occupy.

Judging from what I saw of the Mázár and Shulut valleys, I should say that the numbers given me are not overstated. The Chugáni of Pariana and Chitala on the Laghmán side of Kund talk Dehgano, i. e. Laghmáni; but the remainder talk their own tongue, which is nearly allied to that of Nur Dara. The two languages would probably have more resemblance to each other when reduced to writing, but the two tribes cannot converse without an interpreter.

The appearance of a Chugáni is quite different from that of the Afghan or of the Dara Nuri; he is shorter in stature, and has softer and more pleasing features. He affects dark clothes like a tribe of Dárds, the Kolai, in the Indus valley. The headdress of the poorer people is a skull cap, or kind of brown wideawake with a very narrow brim, round which the more prosperous ones bind a dark indigo-dyed pugri. The coat is short, either of quilted indigo-coloured cotton, or of brown blanket-like material. Some wear goatskin coats. The trowsers of those who live where cotton goods are procurable are of that material, but the others have short ones of brown blanket stuff, reaching a little below the knee; black knitted goat's-hair leggings tightly encase the leg from the knee down to the ankle, and when travelling in the snow, thick goat's-hair socks are added. The boots are by far the most picturesque and becoming that I have seen anywhere in the mountains of the East. The round-toed sole and upper leather are neatly joined by a nicely plaited band. Round the instep, and passing behind the tendon Achilles is a strip of embroidery in colours, and above that a high legging of markhor's skin with the fur inside, opening in front, and bound round with a thong. The upper part of the legging is turned down and shows a band of fur a little below the calf. This boot may be found in a rudimentary state on the borders of Kashmir, in Dárdistán, and in Badakhshan and other places, but the Dárds of Chilás and Gilgit wear no boots, and use long strips of skin only, which they wind round and round the foot and up the leg, leaving the toe and heel bare. Round the waist the Chugáni wears a leathern belt into which he invariably thrusts a Kafir knife. Over his shoulder he carries a neatly made quiver with a well-fitting cover,* containing about a dozen arrows of reed, with three barbs and sharply pointed. The bow is of wood and the string of gut. Those Chugáni, who had bows and arrows, were very poor, but it is not unlikely, that the richer ones, who live far away from the influences of the Afghans, may use bows of horn similar to those of parts of Dárdistán; and though I saw no such bow at Aret, yet this seems an appropriate place for the description of one in general use in the mountain tracts of the Indus basin; for instance, in Bashkár Hunza

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* Most of the Chugáni of Aret have guns, but at Kordar and other remote Chugáni towns firearms are rarer.

(Kanjut), Swat, &c., where the warrior, as described by Homer, to this day ascends to the cliffs, and after smiting a goat with "honours of sixteen palms," carefully joins the horns and fashions them to a weapon identical in every respect with that used thousands of years ago by Homer's Pandarus. And in introducing Homer's name, I must again refer to the costume of the Chugáni, and I regret to say to the much-worn subject of their boots; for when the Aret village cobbler came to make shoes for me and my party, to enable us to travel over the snows of Kund, he produced a veritable last, and fitted the boots thereon with wedges. But the preparation of the leather was the interesting part of the performance. A piece of bull's hide was produced, and after being smeared with some lubricator, Homer's five brawny curriers tugged at it with all their might for an hour, and the Homeric leather thus produced lasted my surveyor four months' hard walking over the stony mountains of Gilgit and Ponyál, where any other leather would have gone to pieces in a fortnight.

The Chugáni are Suni, and most devout and attentive to their religious duties, and I have seen their women engaged in prayer; but they are the only Mahommedans I know who allow to the weaker sex perfect and unconstrained freedom. Young and old, married or single, the women go about amongst the men as they do in Europe, and without any of the false modesty of the ordinary Indian or Afghan female. They used to approach me and examine my watch and other things. Mrs. Azim Khan and her daughters used to ask me every morning how I fared, and became at last quite friendly. In one other place only have I been allowed to converse without restraint with the women, and that was in a remote and wild part of the Brahui country, where mollahs were unknown, and the tenets of the Prophet but imperfectly understood. At one Brahui hut where I was resting, my host ordered his young wife to sew up a rent in my coat, and she readily obeyed.

The dress of the Chugáni women is most tasteful, and the women themselves are many of them very pretty. The wardrobe of the woman of Dárdistán consists of a shapeless and dirty sack, extending from her neck to her feet; and on to her head she flings, anyhow, another equally shapeless and dirty bag, her only other covering being a thick coat of crusted dirt; but the Chugáni young lady takes a pride in her appearance. She wears an embroidered coloured skull cap, with a long tail reaching to her waist, ornamented over the forehead and down the back with coins, beads, and shells. The hair is cut in a fringe across the forehead, as amongst our own young people, the back hair being gathered into plaits; over her shoulders she wears a dark-coloured embroidered kind of waistcoat, and over that a coatlet of some dark colour extending below the knee, and with fairly tight sleeves. Her trowsers, which are sufficiently well fitting, are often of some bright colour and quilted. Round her neck are several rows of large beads, the necklaces being tight, and of brightly contrasting colours. Suspended from her neck and extending across her chest are one or more large semicircular silver ornaments, similar to those I have seen for sale at Jalálabad, and also in the central Himalaya, the name of which I forget. A leather belt round the waist completes the costume. Married women wear a pugri over the skull cap, and do not cut the hair into a fringe. While I was at Aret, the whole of the young ladies of the household of Azim Khan, my host and protector, came out in brand-new clothes, and very pretty they looked. Some 500 feet below the house there was a grove of magnificent walnut-trees, under the shade of which I passed many pleasant hours. A clear foaming mountain-torrent bounded over the granite boulders at my feet, and around rose the neat terraces of green waving wheat. Tiny cascades sparkled and splashed down the rocks that cropped out of the steep mountain slopes, ferns peeped out of the dark shady crevices, and English ivy clung to the lichen and moss grown rocks, and tried to hide them with its dark green mantle. The notes of singing birds filled the air, and down the winding mountain path used sometimes to come troops of merry Chugáni girls, with their nicely made kilta at their backs. Miss Azim Khan, aged 15, with her Grecian-looking water-vessel strapped into her kilta, was a pleasant sight to look upon. The women and children seemed always to be busy, and never out of sorts, and used to attend pretty constantly to the field work, whilst they left the household duties to the master of the house. To him—a stingy, covetous, grasping man, fell the distribution of the food to all the members of the household and guests; he had his eye on every piece of cheese and meat eaten. His idea of performing the duty of the host was to make me pay exorbitantly for all food consumed in his establishment while I was with him. He was twitted one day by the Dara Nuri who accompanied me to Aret, for his meanness in not giving me a ziáfat or entertainment, so he just asked me for three rupees, and then killed a goat in my honour. The Chugáni all helped at cutting up the carcase, and then to my astonishment ate at least half of it in a perfectly raw state, without putting it even near the fire. The remainder was boiled in a big pot, and I received my share.

The small, straight-backed, Kerry-looking cows of the Chugáni give quantities of milk, the whole of which is daily converted into cheese. Butter is not used, or if so only to a limited extent. Black cows, though not so well bred as those of Aret, prevail throughout Dárdistán, and here, where I write these notes, overlooking the Indus, they are at this moment feeding round my tent. As far as I could learn, cows are the only money known in Chugánistan. A man will give three cows for a black cotton pugri with a coloured silk edging. There are no shops and no banias, salt, lungies, guns, &c., being obtained by barter at the larger towns in the Nur Dara. Fines of so many cows are inflicted by a bench of the three chief Maliks of Aret, on any of the tribe who may infringe the very simple code of Chugáni laws. One of the men who accompanied me back to Dara Nur from Aret, was found to have stolen a pugri from a friendly fort where I was staying. He was followed and overtaken, his Kafir knife was taken from him, and I was told that Azim Khan, the chief Malik, would be fined twenty cows for this offence against the Dara Nuri.

The view from the Utchatic Gali Pass (7300 feet) which overlooks the Aret valley, is most extensive, and in one direction impressive. Two thousand feet below the spectator is the chief town, clinging to the steep side of the mountain opposite. For miles up the valley are stretches of carefully made terraces, and on the crests of the spurs which come down from Kund, are situated numerous hamlets. Among the wheat-fields are prettily-built isolated houses, and sometimes just peeping out from the dense foliage of the walnut groves. Beyond the wheat-fields and behind the most distant of the hamlets are the slopes of Kund, black with pine forest, and higher up, where the vegetation is less continuous, green grassy knolls and wild craggy peaks begin to show amidst the pine woods. Above this is a belt bare of all vegetation except the creeping juniper, and topping the whole, and almost lost amidst the clouds, are the peaks and snow-fields of Rám Kund, or, as it is called by the Kafirs, "*San*," "the lofty."

Turning eastwards, and below you some 5000 feet, winds the rich valley of the Kunar river, with its forts and walled towns, backed up by a brown range, the highest point of which is Elazai, 9000 feet, above the crests of which the inhospitable barren-looking country of the Bájouri and the Men of Dir stretches away into the remote distance. In the south, far off in the hazy brown mists of Afghanistan, is the Jalálabad plain, seen across the spurs of Kund and Kashmund mountains, the chief streams which water the plain and the cultivated strips along their edges being just discernible, and with my telescope I could dimly make out the minute white line of the tents of our army at Jalálabad. This view is backed up by the long, serrated, snowy line of the Safaid Koh, which is so distant that it looks as if it were floating off into space, the lower parts of the mountains being of the same colour as the sky above.

The vegetation of the range whence these views were obtained is rich, and like that of the Murree hills. *Pinus excelsa*, she-oak, holly-oak, olive, and pomegranate grew in profusion; and higher up, the black foliage, either of the straight so-called silver pine, or of *Abies Webbiana* or *Smithiana*, clothed the mountain sides. I could see no birds. Differing in this respect from the Safaid Koh, there were none of the edible pine nor deodars, and though large quantities of deodar timber are floated down the Kunar river to Peshawur, I could not detect any, even on the most distant spurs.

Throughout the Aret and Shulub valleys there is not a single fort or tower of defence. Though the hated Sáfi live so near them as at Islámabad, only three miles down the valley, yet the country is so steep and rugged, that the Chugáni say it is a strong fortress in itself, and they always keep so much on the *qui vive* that they do not require to hedge themselves in behind towers and walls as do the Afghans. These people never leave their pleasant mountain homes for the hateful stony plains, and I was the first to point out to Azim Khan the position of the chief places in the Jalálabad plain. To Jalálabad he had been only once in his life, and that was on the occasion of his visit to me, and that after my friends in the Nur Dara had given hostages for his safety.

During my abode with Azim Khan, I lived in his suburban house, which was about half a mile below the chief village. At night the women and children used to retire to their house in the town, but the men and Azim Khan himself used to remain with me. To the town of Aret I was taken once only, and then to see a sick man, and I must say that it is one of the most remarkable collection of houses I have ever seen. As stated, it is built on the face of a very steep slope, and the houses, of which there must be 600, are arranged in terraces one above another. From the roof of one of the lower ones I gazed with astonishment at a vast amphitheatre of carved wood—at thousands of carved verandah posts, and at tens of thousands of carved panels, with which the upper story of each house is constructed. These panels, which are arranged similarly to the shutters of Indian shops, are ornamented with every conceivable variety of carved pattern. The carving completely covered the woodwork of the upper story of every house. The lower story is of stone and wood, and double the extent of the upper, and this allows an open roof space on which the inhabitants mostly pass their time in fine weather. One house in the upper part of the town was nearly new, and of a light mahogany colour, but the woodwork of the others (pine) was as black as bog oak, and the inside of the one I visited blacker if possible. The furniture consisted of cots (*kát*), stools (*stá*), earthen vessels with Grecian-looking ears, and cheese-making utensils. Agricultural implements, such as shovels of wood, rakes, &c., were stuck in between the blackened rafters of the ceiling. On the whole, it was a superior habitation to those enjoyed by most Indians. Below the town I passed the graveyard, or a portion of it, for cultivated land is so valuable, that the graves are scattered about amongst the rocks in any spot which is not too steep to bear them. The graves have built stone walls and are covered in with slabs, the body not being allowed to come in contact with the surrounding earth. Highly ornamented and fantastically carved head and foot posts stood at the ends of the graves, and one, which was new, had remarkable carved posts painted red, with a row of pegs neatly inserted at the back of each, the number of pegs (nineteen in this case) corresponding with the number, chiefly of Sáfi, the deceased Chugáni had killed during his lifetime.

On a knoll, below the town, I was shown the shrine of "Bibi," the patron saint of the Chugáni. "The lady" was a woman hero who, in one of the great fights with the Sáfi, assumed the form of a snake. During the battle she was struck with a sword, and from the wound there poured, not blood, but milk. From this miracle it became evident to the Sáfis that it was no ordinary serpent they had killed, so they took the body, and buried it down the valley at their own town of Islámabad. When the Chugáni became aware of their loss, they made a great effort to recover the body of the snake, and after a great encounter became possessed of it again, bringing it back to the place where the tomb now stands; thus it happens that at this time there are two ziarats or shrines dedicated to Bibi the lady—one at Islámabad and one at Aret. It is said that the spirit of the woman hero is still present in the fights with the Sáfi, and that to this day she aids the Chugáni in battle. This "Bibi" can be no other than our friend Nagobai in another guise. In parts of Dárdistán, rock-gods called Nagobai may still be seen, and even amongst the bigoted Afghans, stories of snake demons are still told, notably at Bosawal, on the Kabul river, where you are informed that the utter barrenness of the Markuh (snake hill) and Bedaulat (worthless) is due to the burning of the body of a great snake which used to infest that part of the country. A holy man of Batikol (whose name I now forget), on hearing of the depredations of the monstrous reptile, went out against it, and after a desperate fight overcame it. On death overtaking the snake, it was immediately consumed by flames, and the heat was so great that the surrounding hills were burnt up, and have remained barren ever since. The shrine of the victorious saint is still pointed out at Batikol, and is considered a place of great sanctity.

During my stay at Azim Khan's, many Chugáni from the surrounding villages came to see me, my watch, my telescope, and my breech-loading rifle. They were much interested also in my prismatic compass, and I always had to show these pious Mahommedans the true direction of Mecca. Amongst those who came were two from Kordar, who walked in with their bows in their hands, their quivers over their shoulders, and their foreheads bound round with a piece of broad black tape; one was a pleasant-looking young fellow, with light hair, ruddy cheeks, and brown eyes, and he told me much about the Sanu* Kafirs, his next-door neighbours; and what little information I gleaned about them I may as well now relate. There is much friendship and some traffic carried on between the Kordar Chugáni and the Sanu Kafirs, and the Kordari all talk the language of the Sanu fluently.

The little-known people whom the surrounding Afghans are pleased to call Kafirs, are now confined to a tract bounded on the north and north-west by the Hindu Kush, to the east by the Hindu Raj, and to the south and south-west by the Kund range and by Laghmán. The tribes are very numerous, and I never found two people who agreed in the names of four out of five of them. Some of the ideas the Chugáni entertain of the Kafirs, I may as well set down here in the language of the latter people as near as I have been able to pick it up.

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* The *n* of Sanu is very nasal.

Kapirawa mala weri san,* kam mala san oru oru
Kafirland in many languages there are, tribes many there are (with) different

jibasi. Katawa Guruwa san. Parunawa tupaka ne si. Madani mats (mas)
tongues. The Katawas are riders. The Páruns guns have not. With clubs men they

lán. Majgali pai san, tupaki san tupchi san. Shikari mats san,
kill. The Majgalis are beautiful, have guns (and) are shots. (They) are Shikari men,

maladin mala peshtin. Sowa kata maisten Wáma san. Kota Wáma,
very active (and) very swift. Than all the nicest are the Wámas. Than the Wámas,

distu Katawá san. Nishai da Wáma da sanusta san.
the chief are the Katawas. The Nishars than (?) the Wámas are fairer.

Some day, perhaps, we may learn the position of the tract occupied by the great tribe of Katawa, which is sufficiently open and level to admit of those people becoming good horsemen, such as they are reputed to be by the surrounding tribes. Perhaps they may live in a Pamir-like country on the southern slopes of the Hindu Kush. I believe they are the Katora of Burnes. They live beyond the Sanu, and between the two tribes is a high range. They live in a chronic state of warfare with each other, and talk different languages. "In the country of the Katawas is Palus, the highest of mountains," which would indicate a peak of the Hindu Kush, perhaps. Where, again, are the Párun, who have not yet got beyond the use of the clubs in battle?

The Sanu, who are called by the surrounding tribes the Wáma, or Lal Kafirs, number some five or six hundred houses, and live at the upper end of the Pech Dara. They are described as a merry lot, given much to dancing, singing, music, and wine-bibbing. At their meals, they sit in a circle, eating sedately and with dignity; the silver wine goblet, placed on a stand conveniently near, being from time to time passed round among the company. The Sanu shake hands in the English fashion. They make all the knives worn by the Chugáni, and like them wear dark clothes. The dress of the women, who are handsome, is looser than that of their neighbours, and they tie up the hair with a silver band. Long, massive silver chains, presented by the tribe, are worn over the shoulders of warriors who have deserved well of their class. The Hazar Malik, or priest, whose office is hereditary, is the only person allowed to enter the places of worship. As far as I could ascertain, the religion is simple. Men call on their gods for aid in battle, vowing offerings to them if they are successful in the fight; and these offerings

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* Pronounced half like sin, and half like san.

—sometimes spoil from the enemy, and sometimes such things as silver goblets and other vessels—are stored up in the temples. It is said, with what truth I know not, that in the temples are the accumulated offerings of hundreds of years; in which case veritable museums of old curiosities must they be.

The general term for the deity is Khudáe, but there are gods such as Deogán, Thákur, Indrá, Sheojee, and many others. The Chugáni, who, of course, had seen only the outside of the temple of Deogán at Sanu Glam—for had they been caught entering it they would have been cast down from a cliff—stated that the building was hung about with bright-coloured cloths and variously ornamented, and that Deogán was a carved wooden image of a fierce-looking being, sitting on a stool, making a horrible grimace with his tongue between his teeth, and drawing his club or sword from behind his shoulders ready for striking. The god was also armed with a knife and a gun, and his eyes were picked out with some bright colour or with gold leaf, "like life."

The Sanu do not bury their dead, but after placing them in wooden coffins, store them away in caves in the mountains, i. e. place them in natural mausoleums.

The Sanu sent me several warm invitations to visit them—in fact, they seemed just as anxious for me to reach their country as I myself was to go; and the day I was carried out of Aret, so ill as to have to be lashed on to a couple of poles like a cross—on that very day, but after I left, a deputation from the Sanu tribe entered the place, having come to escort me back to their town of Sanu Glam, and thus I never met the Kafirs face to face.

In case any of my countrymen should manage to reach Aret, and have an opportunity of proceeding on to the Sanu, I give in the language of that race the different stages from Aret.

Virsuk gandal si.	The road is bad.
Rustori maral Sánawa oik.	The first stage of Sán (Kund) on one side.
Dvas maral pántere Digalata si.	The second day's journey beyond Sán at Digal is.
Trewas pántere Sirata (or Sirtai) dingalamash.	Three days after at Sir we shall arrive.
Satawas pántere Kordar dingalamash.	Four days after (at) Kordar we shall arrive.
Ponchwas pántere Sanu Glam dingalamash.	Five days after at Sanu village we shall arrive.
Dronak pa maral si.	Dronak half a stage—half-way—is.

There is said to be another route to Sanu Glam, which leads over the Lendalam (?) Pass through the village of Palas at the head of the Chowki Dara.

The *proper* road to Kafiristan from Jalálabad would be through Tregarhi in Laghmán, up the Alingar river, and here would be no mountains to cross. At Tregarhi Kafiristan was staring us in the face two marches off, but the tribes intervening would have to be conciliated before an entry that way could be made.

The Kafirs are continually being encroached on by the surrounding Afghans, except from the north, where the Hindu Kush seems a sufficient protection. Raids on a large scale are constantly made on them, partly to wrest from them their land, partly to secure their women as slaves, and partly by fanatical Mahommedans on religious grounds. At Tregarhi (or Tergarhi) in Laghmán, a man who had joined in a great raid, made some years previously, informed me that when the Gházis, many thousands in number, arrived at the Kafir frontier, near the head of the Alingar river, they were set upon by a small band of Kafirs under a famous leader named Ladria, and ignominiously put to flight. Many Afghans were slain, and a terrific storm which came on at the time wetted the powder of the firelocks, and rendered the rout complete, and the discomfited Gházi never stopped their flight till they had got safely back to their own homes. During the life of Ladria the encroachments of the Pathans on the Kafirs in that direction were much checked. He eventually fell a victim to Afghan treachery. Major Biddulph mentions that towards the east the ruler of Chitral has continually warred on the Bashgáli Kafirs, and how some have been converted by force to Mahommedanism, and how others have been made to pay tribute. This chief derives a considerable revenue from the money he obtains from the sale of the Kafir prisoners, male and female, whom he takes either in war or by treachery. The rapidly diminishing Kafirs are also preyed on from the direction of Chápar Serai, whence come upon them hordes of Momands, Sáfi, and others, to plunder their lands and houses, and to tear from them their wives and daughters.

One would have supposed that the first act of the English in Afghanistan would have been to seek the friendship of our natural allies, the Kafirs, so as to have played them off against our numerous enemies in the Laghmán and Tagáo valley; but this, practicable as it seems to be to an outsider like myself, has never been done. Burnes, in the first Afghan war, turned a cold shoulder to "our cousins," as they called themselves, and they returned to their valleys impressed only by our hauteur and pride. During the present campaign, the existence of thousands of hardy mountaineers, inured to war and hardship, and who, I have no doubt, would gladly help in paying off old scores against the Mahommedans, has been ignored.

Before I close this note I should mention one or two things respecting the Chugáni that I had forgotten. They state that they originally came from a village in Kashgar to Kordar, in the Pech Dara, and then, as their numbers increased, they came further south and formed the Aret settlement. In the Dara Nur and neighbourhood there are, at different places, large stones with ancient writing engraved on them, notably near Kalatik ("little fort"), near the shrine of Khoja Kambar Baba, at the edge of the Dasht-i-Gamberi, and at Shulut, on one of the boulders below the village in the ravine. None of these I saw, nor the remains at Islámabad, or at Bimbakot, the reputed capital of the Hindu Bim Raja, which is also in Dara Nur.

On the summit of Kund (Amrit or Rám Kund), there is a small lake, and on its shores still rest the remains (petrified) of Noah's Ark. In the plain of Laghmán below is the tomb of Lamech, Noah's father. In Nur Dara, or the valley of Noah, is Nurlám, or the town of Noah. At the mouth of the Mázár Dara is Nur Gal; and lastly, I may mention that the Chugáni who helped me much with my Kafir vocabulary was named Hazrat Nur, or the prophet Noah himself.

I found an exact representation of the Kafir knife in bas-relief on a figure in the enclosure of one of the Topes of ancient Hada, which I opened. At the same place I dug up a number of small well-executed pictures from the life of Buddha, in limestone; some of the tablets were of battle scenes, and one figure brandished in his hand the short square-headed sword now used in Nepál. A similar sword, I was informed by an armourer of Jalálabad, had passed through his hands to be cleaned and sharpened; it was being sent as a present from some tribe of Kafirs to Amir Shere Ali, at Kabul.

I have several times made use of the word Dárdistán, not because I am certain that such a country actually exists, but because it has been used by others before me, and is convenient. I don't know how Major Biddulph or Dr. Leitner employ the term, nor do I know the meaning the latter assigns to it. Drew, in his 'Kashmir and Jummoo,' and others, employ it without giving an explanation of its origin. What I have learnt from personal inquiry is this: that the people of Kashmir vaguely call the mountain region to their north-west Dárdistán, and the Gurairi and Astori call it Dáristán, and I met an old man in Kashmir who said his ancestors originally came from Dárad; and Dr. Scully, of Gilgit, informed me that he had met natives, who talked of the Dárd language. Now, in the extreme west of the so-called Dárdistán the Laghmáni and the Dara Nuri call a mountain* "Dár," and the Shins † of the extreme east of the region call it the same. Dáristán is then nothing more than Kohistán, or Highlands, and I believe the Dárdistán of the Kashmiri is a corruption of this word; but I have never been successful in finding any one who could say that he had been to Dárdistán, or had seen it, or had met anybody from that mythical country; but the term is convenient, and should, I think, be generally adopted, and I will now try and point out what I consider should be the limits of the tract, for it is too late to change it whether it has been rightly or wrongly adopted by others. As

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* The difficulty is that the word for ridge of the mountain, as used in the Punjáb Hills, is *dhára*, not dár, and Dard is unquestionably *darada*—both Sanskrit words.—R. N. C.

† Pronounced Shi*ng*, with the *ng* very nasal. The country round Chilás is called by the people to the east Shingyaik or Shingaik, which literally means Shing yághi, or the independent Shings.

Dárds, then, I would first and foremost put the Shins, as being those originally called Dárds, and as being perhaps the most numerous of the (so-called) Dárd group. After the Shins come the Yashkani and Koli who occupy that part of the Indus and its tributaries between the Chilás country and that of the Pathans lower down. Now, travelling in a westerly direction, come the Bashkári, with their curious salutation of "Badbadia," "You are welcome." Then the Káshkári, with Chitral as their capital. South-west of Bashkár and south of Káshkár come the Men of Dir and Armar and the Panjkora region, but of them I know nothing, and hope soon to learn from Major Biddulph's report now issuing from the press. West of the last-named people are the numerous tribes of Kafiristan; and lastly come, to the extreme west, the Tajiks of Laghmán and Nur Dara, the Daménchi, and the Chugáni.

There are also other numerous tribes who are subdivisions of those here given, and who are mentioned in Major Biddulph's report. I dare say I shall make some people faint at my temerity in calling the Tajiks of Laghmán and Dara Nur Dárds, but what is to be done? Their language is so closely allied to those of the Dárd languages already given to the public, that for convenience sake they should all be lumped together in one great group.

But the christening by an arbitrary name of an extensive and important region like this so-called Dárdistán, can never perfectly succeed, and I regret it in this instance, for the languages of the country are so similar to each other and mingle so imperceptibly one with another, that they should be treated as one family group. The difficulty is to define the limits. This is already done to the north-east, where the non-Aryan (Turanian) languages come in, but elsewhere it is different. To the east lies Kashmir, and why should this really Dárd tongue be excluded from the list? To the far south, and separated from the Dárds by a band of Pushtu-speaking people, we find the Panjábi, and below them the Sindhi, whose country has been formed from the washings of the mountains of the Dárd races, and whose language is so Dárd-like that one might almost fancy that Aba Sin, the Indus, had brought it down along with the silt.

On the termination of the paper,

Colonel H. YULE said that Kafiristan was a subject on which, as it appeared to him, one man had about as much right to speak as another, because, as Mr. Cust had rightly stated, no European had ever been there. Ever since he had read Burnes's Travels—more than forty years ago—he had felt a great curiosity to know the mysteries of that country; but, on the other hand, he believed that when that region should have become thoroughly known, the time would have arrived for the Geographical Society to close its doors, for its work would then be pretty well concluded. Kafiristan was one of those few knots of mystery which now remained to afford perpetual enjoyment in seeking to disentangle it. The upper part of the country must in all probability be the highest and most difficult portion of the Hindu Kush, as might be judged from the fact of its never having been penetrated by any army, so far as was at present known. To the west of it there was a great series of passes, many of which had been crossed, terminating in the Khawak Pass, crossed by Captain Wood forty years ago, and, as Sir Henry Rawlinson some time ago mentioned, by the great Timour on his expedition to India. Afterwards Timour made an incursion into the Kafir country, and committed great slaughter among the people. The account of his campaign, which was translated in the third volume of Elliot's 'Historians of India,' was exceedingly interesting and striking, but it was impossible to follow the geography. The great king had himself to embark in a basket, and be slid down the snow slopes, as he described in his memoirs; the narrative, indeed, reminded one of Napoleon's great passage of the Simplon, only greater difficulties were encountered. On the east of Kafiristan there were passes leading into Badakhshan from Chitral, and these had been crossed by the pundits, havildars, and other travellers sent out by the Survey Department of India; but with regard to the passes along the district, 150 miles in length, intervening between those he had mentioned, absolutely nothing was known. Of late years fragments of the languages of the various tribes along the frontier had been picked up, all evidently belonging to the same stock, and that the same as our own. By referring to some of the works which had lately been published, including those by Major Biddulph and Dr. Leitner, ten or twelve dialects might be compared, and it would be found that the numerals were almost exactly the same as the Sanskrit, which were, in fact, fundamentally the same as those used by ourselves. The name "Kafirs" was, of course, no national name, being merely the Mahommedan word for an unbeliever. When Vasco da Gama first arrived in India, he collected from the people he met at Calicut a great many notices of the nations and countries further east. In his narrative he mentioned that Pegu was inhabited by Christians, and that Sumatra was a great island also inhabited by Christians. Evidently the fact was that his informers were Mahommedans, and told him "those countries are inhabited by Kafirs, and you are Kafirs," and Vasco da Gama therefore took it for granted that they were Christians. The story of their being descended from the Greeks was a curious one, and its origin had not yet been thoroughly investigated. He had referred to Elphinstone's book to see if any account of it was given there, and he was not sure that it did not arise from a mistake. Elphinstone quoted Rennel, who again quoted Abu'l Fazl, the Mahommedan writer in the time of Akbar, as stating that there was a tribe in the neighbourhood of Bájour who were said to be descended from the soldiers of Alexander, but those passages did not apparently identify those people with the Kafirs. When Elphinstone began to make inquiries at Peshawur, he heard about the Kafirs and their fair hair, &c., and assumed that the report of the Mahommedan author referred to them. He (Colonel Yule) was not quite certain, but that appeared to be the foundation on which the account rested. Then when people began to inquire further there were those curious coincidences about blue eyes (though even that had been disputed), and about their sitting on chairs and drinking wine, all of which were European characteristics. It was curious to notice that in Colonel Tanner's vocabulary of the dialect of the Dara Nuri, which was no doubt of the same class as that of the Kafirs, "we" and "you" were represented by *hama* and *hémo*, which were certainly very like the Greek ἥμεις and ὕμεις. But the similarity, of course, could be traced through the Sanskrit. He fancied the Kafirs were the remains of a nation of the same race as the Hindus, which, as the Mahommedans had advanced, had been pressed in upon the mountains, and probably there might be a considerable variety of tribes, though the dialects showed essentially the same Aryan and Indian character. Perhaps they formerly extended to the borders of Kashmir, but gradually, as the Afghans encroached, they had become concentrated in the most inaccessible part of the country.

The oldest notice of the district with which he was acquainted, with the exception of that by Timour, was by the Jesuit traveller Benedict Goes, who, in 1604 or 1605, travelled that way, trying to get to Cathay. He mentioned that when he arrived between Peshawur and Jalálabad he heard of a country to the north called "Capperstam," in which there were a people who were very hostile to Mahommedans, who made and drank wine, had temples, and dressed in black garments; in fact, in a few lines he gave substantially almost all the facts, with the exception of those relating to the language, which were known at the present day.

Mr. Delmar Morgan said that when he was travelling in Central Asia last summer, he met a Russian officer who had visited Badakhshan and seen some of the Siah Posh Kafirs. He described them as a fair people, of distinct Aryan type, small in stature, but well-built and very warlike, constantly fighting with the Afghans or among themselves. He expressed surprise that no attempts had been made by the English to explore the country from the Indian side. The same opinion had been expressed by other scientific Russian geographers.

Mr. Seton-Karr said he quite agreed with Colonel Yule that on this subject the critics were almost on a par with the author and reader of the paper, for all their knowledge must have been obtained at second-hand. He would be glad if some one would enlighten him on one or two points. For instance, the word "Spin" was used. If he recollected rightly, in one of Dr. Bellew's books there was an account of the Spin Tarins, and the Zarrins. He apprehended that the word "Spin" must be the same in both instances. He also wished to know if any one could state whether the population of Kafiristan was decreasing. He imagined that a body of men shut in and separated from all intercourse with the outer world would decrease rather than increase. The prominent remark, however, which occurred to him when listening to the paper, was that when Englishmen invaded a country, officers were always found who, in spite of campaigns and sieges, would attend to the pursuits of science and antiquities, and no doubt, as time went on, a detailed account of this secluded region would be obtained. He had heard it suggested that Kafiristan would be rather a good recruiting-ground for our troops, and that it would be quite possible to form a troop of irregular Kafirs; but in a political point of view it would be difficult for any officer of the Indian army to go to Kafiristan and enrol men to serve under the English flag.

Mr. Trelawny Saunders said it was desirable that the situation of Kafiristan should be more generally understood. On the north it included a part of the great Hindu Kush, which begins on the east where the Indus basin is divided from the Lake Lob basin on the one side, and the Oxus basin on the other, and terminates just beyond the Bamian Pass. The mountains bounding Kafiristan on the south were a portion of the same range which bounds Kashmir on the south, that is, they form the western extremity of the Outer Himalaya, Kashmir being situated between the Inner and Outer ranges of the Himalaya. Both ranges were cut through by the great gorge of the Indus, and passing on, the Outer range is formed by the culminating summit of the slope that comes up from the plain to Peshawur; while the Inner range is prolonged on the west of the Indus by the mountains which rise from the south side of the Gilgit river. This extension of the Inner and Outer Himalaya on the west of the Indus is also cut through by the Kunar river. The intersection of the Himalaya by the Indus was only explored quite recently; and the passage of the Kunar range is still unknown. The upper part of the Chitral valley had been reached, but the gorge through which the river passed out of it never had been. The culminating summit of the range on the south of the Gilgit river is quite distinct from the summit of the slope from the plain of Peshawur. Though the members of the Trigonometrical Survey had not been able to penetrate into

Kafiristan, they had been able to determine the longitudes, latitudes, and altitudes of a great number of peaks, and to show that the outer ranges of the country ran up to 15,000 or 16,000 feet rapidly from a base which was only 2000 feet, or 1900 feet at Jalálabad. The passes must, therefore, be very difficult, and the inaccessibility of the highlands to hostile forces is thus explained. The rivers Kunar, Kabul, and Panjshir form almost a complete circle around Kafiristan. The only European who had got near Kafiristan on the north side was Captain Wood, who discovered the source of the Oxus. When he was visiting the lapis-lazuli mines he heard of the Kafirs, and of the terror with which they were regarded by the Mahommedans of Badakhshan. There were some curious circumstances in connection with the names of the country. Besides the abusive name which the Mahommedans gave it, it was called Wamastan, a word which it was difficult to understand. It was also known as Katur; and to this day one of the divisions of Kafiristan was called Katur, which was identical with Katawar. The chief of Chitral, who was of the same race as the Kafirs, also called himself the Shah Katur. Other points of interest connected with this name, as well as with the political, religious, and ethnical branches of the subject, could not then be noticed for want of time.

The Chairman (Sir Henry Rawlinson) said that Elphinstone, as Mr. Cust had stated, was the first person in modern times to bring the Kafirs into notice. His account was not merely hearsay gossip, for he sent a native officer, who was specially qualified for the mission, into the country to examine into the history of the Kafirs, and he thus obtained a very valuable and accurate report. A singular incident connected with this report was the very remarkable forgery which was founded upon it, and which for a long time imposed upon the geographical world of Europe, and was at last exploded by the Geographical Society. This was an account of a journey from Kashmir to the Russian frontier, stated to have been performed by a German traveller, published in Russia as an authentic narrative in the year 1806. The point which really mystified all geographers was the extraordinary and apparently accurate account that was given of Kafiristan, not only describing the manners of the people but also giving many of the native words. The traveller mentioned one temple which he said was called Imra Umra—the house of God. When he (the Chairman) learned that ten or twelve years afterwards Mullah Najib found the same names in the same country, he did not understand it, and confessed that he thought that there must be some foundation for the account which had been given, but ultimately, on further investigation, he discovered that there was a mystification of dates. Elphinstone's book was published in 1814, and the so-called travels, which were stated to have been published in 1806, must in reality have been concocted after that date, and the evidence which appeared to be so convincing was merely a copy of Elphinstone's report on the Kafirs. With regard to the subject of the paper, he (the Chairman) might say that he had an advantage over some of those who had addressed the Meeting, because he had seen numbers of Kafirs and conversed with them. During the three months which he passed in Kabul forty years ago, he repeatedly saw them, and the most beautiful Oriental lady that he ever saw was a Kafir slave. She was the only lady that he had ever met with who, by loosening her golden hair, could cover herself completely from head to foot as with a screen. Certainly the appearance of the people did give a rather strong presumption of Greek origin; but it was well known that historically there could not be any real ethnic relation. It was just possible that as Greek art gave a certain tone to Indian art, so the manners and customs of the Greek colony which existed for 300 or 400 years in the Hindu Kush might have given a certain tone to the manners and even the physical type of the Kafirs. Still, the language of the people showed clearly that they were an old Aryan tribe, similar to some twenty other tribes in those mountains. The Afghans themselves were nothing more in their origin than one of those tribes, just the same as the Shinwaris and many others, every one of which had a separate dialect and a separate history. Of course it was interesting to investigate the antiquities of the Kafirs, but probably not more so than to investigate the history of any of the other tribes in the mountains—with this single exception, that their type was better than those of most of the tribes around; and in the second place, the kernel of the race had never adopted the Mahommedan religion: they were still pagans. Major Biddulph, who had been resident for many years on the frontier, and who was invited to visit the Kafirs by two special deputations, had recently published in India a book* in which he gave very full details of their language, their religion, their manners, their history, and everything except the geography of the country, which he did not venture to touch upon, as he only saw it from a distance. Any gentleman who took an interest in the subject might refer to his chapter on the Siah Posh Kafirs, which was full of interest, and particularly mentioned the wonderful horns which the ladies wore as a headdress. He said:† "The Bushgáli women have a curious headdress consisting of a sort of black cap with lappets, and two horns about a foot long, made of wood wrapped round with black cloth and fixed to the cap. This curious fashion does not seem to have been always confined to those tribes, or it may be that they were more widely spread than at present. The Chinese traveller, Sung-Yun (writing in about 520 A.D.), of the Ye-tha, who must have been the people of Sirikol or Hunza, says, 'The ladies cover their heads, using horns, from which hang down veils all round.'" Major Biddulph showed that this very peculiar headdress was noticed also by the Chinese traveller Hwen Thsang in the seventh century, and was still retained. He also gave an account of another curious custom. He said: "The Siah Posh are exceedingly fond of dancing, but their mode differs considerably from that of the tribes to the eastward. Instead of only one or two performers, everybody present, women as well as men, join in the dance together. A village dance was held before me—a wild and strange exhibition—the men brandished axes, clubs, and guns which they fired off at intervals, amidst a chorus of whoops and shrill whistles. At times the whole would lock arms by pairs and revolve backwards and forwards in a grotesque waltz, or following in order wind round and round in figures of 8. Sometimes all would break off and dance singly, setting first to one and then to another in a sort of wild jig, or, forming in lines with locked arms, advance and retreat in steps like the Koles of Chota Nagpore. The music consisted of two drums and a feeble flute made of bamboo. On the death of a man, his corpse is carried round the village in procession for several days before being finally disposed of, the attendants dancing round it."‡ He quoted these as specimens of Major Biddulph's report, which contained a very long account of the manners and customs of the Kafirs. It had been noticed that the general country was called Wamastan. He suspected that the word "Wam" was simply the Sanskrit *wan*, a jungle, and that the word meant the jungle country. But the natives themselves divided it into three tribes, the Rumgal, the Waigal, and the Bushgal—*gal* being their name for a country. Each of the tribes had many subdivisions. Then, again, the Kamuz and the Kamtuz were spoken of, which meant Upper and Lower Kam. Major Biddulph had alluded to the Dehgáns, which was a word equivalent to Tajik, meaning a villager, and Colonel Yule might remember that Marco Polo spoke of the Dehgáns at Kunduz, and that the name referred to a separate country; but it was merely the Tajiks who still retained the name of Dehgáns to the present day. He would not discuss the question of the Kafir religion, but it was fully treated by Major Biddulph, who showed distinctly that it was a sort of bastard Brahminism. Indra and Manu were the two great gods, but, curiously enough, the people did not know that they were connected with Brahminism, and confounded Manu with the prophet Mani, whose disciples, the Manichæans, were prevalent in Central Asia: and "Indra" they called "Imbra." Major Biddulph gave the names of some twenty gods, and described many of them. He said: "There seem to be grounds for supposing that the religion of the Siah Posh is a crude form of the ancient Vedic. One Supreme Being is worshipped under the name of Imbra, and next to Imbra in importance is the prophet Mani. He is called the son of Imbra, and once lived on earth, and he mediates with Imbra on behalf of men. Stones are set up as emblems of Imbra, but carved idols are not used. These two names cannot but suggest the Indra and Manu of the Brahmins. Below them in rank are a whole host of deities, whose number is stated at 18,000, evidently an arbitrary number. Some of these have particular functions as in Greek mythology, but they are acknowledged to have once been mortals, who were deified after death. First in importance is Gej, who is spoken of as a great chief who fought with the prophet Ali, and commenced the feud between the Siah Posh and the Mahommedans, which has continued ever since. Next comes Bagej, the god of rivers, who also has power over flocks and herds. Sacrifices to Bagej are made by the waterside, and the heads of the victims after being burnt with fire are thrown into the stream. Of the others, the most important are Proozi, Dooji, Poorateh (Parbati?), Arum, Marer, Disni, Kroomai, Saranji, and Wir. It is probable that the names of these inferior deities differ among the different tribes, and many of them must be tribal heroes only recognised by particular tribes." *—Major Biddulph had also found a great number of antiquities, including a good, rock-cut figure of Buddha seen near Gilgit, and also an inscription in the old Sanskrit of the third century. The sculpture was apparently one of the figures mentioned by the Buddhist pilgrims. Some surprise had been expressed that more advantage had not been taken of the Kafirs by England in our political relations with Afghanistan; but the reason of that was the excessive jealousy with which the Afghans had ever viewed any connection between the English and the Kafirs. During the time that he (the Chairman) was at Kabul with Sir William McNaghten, a wish was expressed on many occasions to open up relations with the Kafirs, but the Afghans showed such jealousy (supposing it could only be done through England mistrusting them), that the English authorities were unwilling to touch such a very tender subject. The Kafirs, however, used to visit us at Kabul, and were always asking the English to go into their country. Major Biddulph mentioned that two deputations came to invite him; and on the same day that Colonel Tanner left the Chugáni a deputation arrived to invite him into Kafiristan. He trusted that the time might come when the country would be visited by Englishmen. He did not think that such a journey was necessarily dependent on any occupation of Afghanistan, but thought an officer might be permitted by the Government to travel from Peshawur into Kafiristan. If invited by the Kafirs he did not see that there was any reason against it, either political or personal. He should recommend the traveller to keep entirely on the north side of the Kabul river, to go by the entrance of the Swat valley to Dir, then cross into the Chitral valley, and make straight up one of the passes into Kafiristan. He believed that might be done by an active, energetic, enterprising young officer such as Captain Gill, who was always ready for any expedition of the sort; and no doubt it could be accomplished with perfect

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* 'Tribes of the Hindoo Koosh.' By Major J. Biddulph, B.S.C., Political Officer at Gilgit. Calcutta, 1880.

† *Op. cit.*, p. 129.

‡ *Op. cit.*, p. 133.

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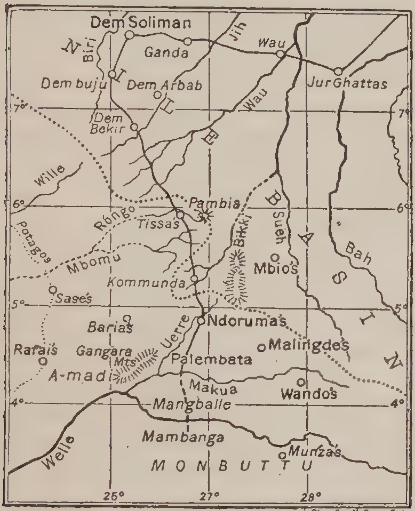
* *Op. cit.*, p. 130.

success. The whole of the tribes were of very considerable interest, if not of any great political importance. Geographically speaking, he was afraid that the Meeting had not learned much. The geography of the country required a very different sort of study and application from that which could be given to it by a traveller who had the means only of collecting on the borders traits of the manners and customs of the inhabitants.

Dr. Junker's Journey in the Nyam Nyam Country.



Stanford's Geog. Est.

For our geographical knowledge of the countries to the west of the Upper White Nile we are dependent almost exclusively on the labours of Schweinfurth and Junker. The latter and more recent of these explorers, a native of Moscow, visited the field of his present researches for the first time between January 1877 and February 1878. On that occasion he penetrated to the south as far as the country of the Lubari, in lat. 2° 45′ S. In December 1879 he again left Egypt for the Upper Nile and the Nyam Nyam country. He appears thus far to be making fair progress in his exploration of the Nyam Nyam territory. It remains, however, to be seen whether the return of Gessi-Pasha to Khartum, and the revival of the slave hunts, will enable him to carry out his plans on the comprehensive scale originally proposed by him. In the meantime we are glad to publish a number of extracts from the traveller's letters. The first of these is written at a zeriba or station which Dr. Junker has facetiously named "Lacrima," apparently on the *lucus a non lucendo* principle, for, to judge from his correspondence, the life he leads there appears to be a happy and not a tearful one. This letter is dated 26th July, 1880, and is addressed to Dr. Schweinfurth, to whose kindness we are indebted for a copy.

"I need say but little concerning my voyage up the Nile and Bahr el Ghazal to the Meshra el Rek. At Fashoda I met Marno, who has just completed a survey of the Nile, from the Sobat upwards, to the obstructive *sudd* in the Bahr el Gebel. My survey of the Bahr el Ghazal joins Marno's. It is based upon 1781 bearings, taken at intervals of a minute, but owing to the variable rate of progress of our steamer, and the necessity of cutting passages through thirty or forty grass-barriers, the result achieved can only be approximate.* The total length of the Bahr el Ghazal, including all its windings, amounts to 130·75 English miles, and your opinion, that former observers exaggerated its length, meets thus with confirmation.†

"At the Meshra I secured several live specimens of *Balæniceps rex*, one of which I gave to Gessi. Subsequently, when I had an opportunity of observing this bird at Jur Ghattas, it afforded me much amusement. It there lived in the society of a troop of chimpanzees. Our noble selves were occasionally compelled to beat a retreat on the approach of these monkeys, and to surrender them our dinners, but the bird appeared to inspire them with a curious dread, and in the end we installed it as an officer of police during meal-times. As long as the 'Abu Markub' remained by the side of our table, no chimpanzee ventured to approach it.

"From the Meshra to Jur Ghattas I travelled by a road somewhat different from yours. I usually estimate my rate of progress at 3·1 English miles an hour, and taking this for the basis of my calculation, the distance between the two places amounts to 115 miles. From Wau to Bisélia I likewise followed your route; the latter station, however, now lies further to the south, near the Gitti. From Bisélia I travelled up the Gitti, and straight on to Idris Wod Defter's, now known as Ganda, and thence to Zeriba Ziber's, now Dem Soliman. At Idris I left my two hundred carriers, with Bohndorff,‡ and directed him to proceed in a S.S.W. direction, by way of Dem Arbāb,§ to Dem Bekir. Gessi overtook me at Ganda, and I travelled in his company as far as Dem Soliman, which occupies the site of your Ziber Rahama's. I there procured a few necessaries from the Government store, and after several days' delay was able to start for Dem Bekir. The distance from Jur Ghattas to Dem Soliman I estimate at 180 miles.

"The road to Dem Bekir led through Dem Gūju, which has been rebuilt a good day's journey to the east of the place described by you.‖ We did not cross the river Biri at all, but merely a few of its tributaries. From Dem Soliman to Dem Bekir is 68 miles.

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* Dr. Junker might have spared himself the labour of taking these numerous bearings. What we very much want in these regions to the west of the Upper Nile is the determination of one or two points by *careful* astronomical observations. Junker's and Schweinfurth's routes, though correct no doubt as to details, cannot be plotted with confidence until they are checked by a number of latitudes, and by at least one trustworthy longitude.—Ed.

† If Dr. Junker is correct, the Meshra must be shifted a considerable distance to the east.—Ed.

‡ Bohndorff, a jeweller, was formerly in the service of Colonel Gordon. In about the year 1873 he explored a considerable portion of the Nyam Nyam country (see 'Oester. Monatsschrift für den Orient,' 1874).—Ed.

§ Formerly Ziber Adlan's of the maps.

‖ Probably on the site of the chief's village, shown on Schweinfurth's map.—Ed.

"Ndōruma* had been informed of my proposed exploration of the Nyam Nyam country, and my approach soon got noised about. Accustomed as the natives are to see their territories traversed and laid waste by armed bands, my appearance, as I learnt afterwards, caused no little terror. The Nyam Nyam never supposed for a moment that Akhū el Básha—the Pasha's brother—as they call me, would dispense with a military escort. Ndōruma, anxious to learn my intentions, went himself to Dem Bekir, which he reached the day after my own arrival. You know the result of my diplomatic transactions with this chief. My assurance that I should enter his country attended only by Bohndorff and my private servants was nevertheless doubted, until, on reaching Kómmunda, on Ndōruma's frontier, I sent back the ten Besingers (soldiers), who had thus far accompanied me. This secured me Ndōruma's confidence. Indeed, now that I have resided for two months amongst the Nyam Nyam, they look upon me as a useful personage, and Ndōruma is by no means desirous of my departure. The reason for this is obvious. I am looked upon as a sort of mediator between the negroes and the Egyptian authorities. Gessi is only too anxious to conciliate the blacks, and to punish the deeds of violence to which they are subjected by the expeditions sent out by him to collect ivory. As long as I remain in the country, robberies and murders are not likely to be committed, for fear of my forwarding a report to the Pasha.

"Ndōruma's belief in my protective power is shared by many other chiefs in this neighbourhood, all of whom, including Wándo, Ngéttwa, Zémiŏ, Bínsa, and Gérria have either visited me or sent messengers. Mbió alone persists in his hostile attitude, and has sworn to kill me. Before I take my little expedition further south, I propose to make a reconnoitring trip. In a few days I shall be ready. Visiting Bínsa, Gérria, and perhaps Wándo and Malingde, on the road, I shall make an effort to get west as far as the Gángara mountains and the A-madi. If successful, I shall return by way of Bánsŭrŏs. Later on, if my health permits, I shall go towards the W.N.W., across the Mbómu, and as far as Sáse's residence, whence, I understand, districts still further to the westward will lie open before me. A Moslem, who has long resided amongst the Nyam Nyam, tells me that a large river flows beyond Sáse's country, on crossing which a country is reached, whose inhabitants pray like Mahommedans. He repeatedly and distinctly mentioned Adamaúa, and said fine goats and sheep were brought from those western districts.

"For the present I return to the geographical results obtained. From Dem Bekir to my Zeriba Lacrima, close to Ndōruma's residence, I followed the native route laid down in your map. The direction was S.S.E., the distance 175 miles. On the road to Tíssa's (Solongo's successor) we crossed the rivers Búseri, Kómmo, Móyo, Zére or Nomatílla, Nambía, and others, together with numerous rivulets, many of them perennial. These are the head-streams of the Wau. The Mbómu does not flow to the eastward. Only two of the rivers crossed on the road to Ndōruma's have a width of over 15 paces (viz. the Búseri and the Kómmu), but they all have steep banks, and their volume is sufficiently ample to form a river like the Wau, for the latter, when I crossed it in April, was only one or two feet deep. In the northern part of Tíssa's country I crossed the watershed of the Wau. Subsequently I came across several rivulets flowing to the westward, including the Róngo, close to Tíssa's residence. This river is 15 paces wide, and its head-streams rise in the E.S.E., in the hills of the Pambía (Nyam Nyam), which are distinctly visible from a neighbouring height. These numerous mountain-streams sufficiently account for the volume of the Róngo so near its source. To the south of the watershed I noticed a striking difference in the riverine vegetation. I for the first time met with those beautiful gallery-forests, so admirably described by you, and my eye once more lighted upon a *Platycerium Elephantotis.* At this very moment, whilst penning this letter, I need only look towards the Uérre rivulet to behold this curious parasite upon the branches of a tall tree.

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* One of the most influential chiefs of the Nyam Nyam, who resides 175 miles to S.S.E. of Dem Bekir.

"To the south of the Róngo I came past several gneiss cones and the craggy Mount Gháza, whence I saw several mountain summits of the Pambía territory, one of which may have been your Abu Shatr. Of the numerous rivulets which I crossed, the Lili and Zóni were the largest. They all flowed westward, to the Bokú, which is said to be tributary in turn to the Mbómu. The latter, I am assured, flows to the Wille,* which is not tributary to the Bahr el Arab, but may possibly find its way into the Shari.

"During my first day's march to the south of the rivulets just referred to I crossed many others, all of which are said to join the Mbómu. The course of the latter was pointed out to me, at several hours' distance to the west, where it appeared to flow to the north-westward. Another line of divide brought us to the Túbbo and other rivers flowing once more to the east. The prospect here is a very extensive one. Far away in the east the Bikki takes its course to the northward, and the range of mountains beyond it, which bounds the valley of the Suéh and screens Mbió's territory, was distinctly visible.

"I crossed the Bikki, and soon afterwards bade a final farewell to the basin of the Nile. The next rivulet I crossed (the Uérre) flowed to the west, and a few hundred yards beyond it, close to Ndōruma's, I have established my headquarters."

From letters addressed to Gessi-Pasha we extract the following passages:—

"The wants of this people are fewer than exist anywhere else. The huts of a chief like Ndōruma are more wretched in appearance than those of ordinary negroes further north. The huts are not grouped in villages, but are scattered throughout the forest. The indifference of the people passes belief. The chiefs admit that leopards annually kill a large number of their subjects, yet no one has thought of planting thorn-hedges as a protection."

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* A different stream from the Welle.—Ed.

"Ndōruma supplies me liberally with all he has. Of maize we have plenty. This being the ant-season, immense quantities of that insect are being consumed. Ndōruma has sent me over twenty large basketfuls. Ant-paste, which we eat day after day with our maize-bread, reminds me of the flavour of liver sausage. A fowl, which we cooked in ant-oil, tasted as if it had been done in butter. Ndōruma's love-gifts are unfortunately confined to ants * and maize, for meat is rare now, as domestic occupations prevent the people from hunting. Still, if we confine our diet to ants and maize, this is not because of our poverty, for my boxes and cases are full to repletion. A good house-keeper, however, must be careful of his stores, especially in Central Africa, for evil times may overtake him."

The last letter received from Dr. Junker is addressed to his servant Bohndorff. It is dated "On the borders of the Mangballe, 1 Sept. 1880."

"From Ndōruma's I travelled south-west to Zémio's, in Palembata, and thence S.S.E. This place is two days distant from Palembata. The Mangballe are Monbuttu. The Welle is said to be one day's march to the south, and we shall cross it, to visit the Mambanga beyond, who are likewise Monbuttu. Thence I intend to go to the north-west, into the A-madi country, having visited which I propose to return to Palembata. If the state of my health permits, I shall go westward to Rafái's and the zeribas of Ghani-Bey." †

GEOGRAPHICAL NOTES.

Captain T. L. Phipson-Wybrants.—Since the publication of the obituary notice in the April number of the 'Proceedings' (page 238), a telegram has been received which states that Captain Wybrants died at a place four days' journey from Umzila's, on the 29th of November, 1880 (his birthday). The telegram says, "Owen saw grave on way to Umzila's," but no mention is made either of Dr. Carr or Mr. Mears, both of whom were reported in previous telegrams as having died of fever. We learn that the remainder of this ill-fated party (under Captain Owen) has reached Inhambane, and that all the property of the expedition has been placed for safe keeping in the Government stores at that place. Captain Owen has returned to Natal, from which place it is to be hoped that he will furnish some information as to the circumstances of the deaths of his leader and two white companions, the details of which are at present wholly wanting. In a letter received by the last mail from Zanzibar, written by Captain Wybrants at a camp in the Portuguese district of Machanga, 30 miles up the Sabi river, dated October 30th, we have the reason given why he had not got further up the country at the date of his death. He had spent nine days in getting his tubular rafts put together, in order to transport his goods on them into the interior; but after all this labour, the stream proved to be so strong that six men were unable to move them, and to his great disappointment he was forced to fall back on that which he wanted so much to avoid, viz. getting more men to carry his goods. This delay, and the time necessarily occupied in engaging porters, will fully account for his only being eight days' journey (or some 80 miles) from the camp at Machanga at the time of his death.—Before leaving the coast, Captain Wybrants, by a series of observations, had determined the latitude of the south end of the island of Chiluan to be 20° 46′ S., this point being laid down in the Admiralty chart in lat. 20° 54′ 30″, thus showing considerable error in the position at present assigned to it, while at the same time his latitude agrees nearly with that determined by Mr. St. Vincent Erskine at the same place.—In his last letter he gives some interesting details with reference to the country of Machanga. He describes it as being very healthy, with a sandy soil, by no means devoid of vegetation. They had frequent breezes blowing during the day from the south-east (which would of course be sea breezes). He says the water is good and vegetables plentiful, especially the sweet potatoes and tomatoes. In the Sabi river he found good fishing, and had shot, on the day of writing, four fine Egyptian geese; indeed, he says that there was no lack of good provisions. The temperature in the shade was 80° Fahr., and there had only been two slight showers. The natives had brought him some rich specimens of gold and copper, and had told him of white men being at Umzila's kraal, these doubtless being the party of Father Law. He reports that his party were all in good health, and says of himself, "I am in better fettle, and excepting the natural anxiety about our progress, can safely say I never was so free from worry and care in my life;" and yet so deadly has the climate proved to be, that in just one month from the day on which he wrote in this hopeful strain, he had found his last resting-place in African soil.

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* That is, the gravid female termites.—Schw.

† Dr. Junker refers to a map which has not come to hand. The sketch introduced at the head of the present paper is drawn by Mr. Ravenstein from his descriptions only.—Ed.

The Missionary Expedition to Umzila's Country in South-East Africa.—Through a letter addressed by Père Croonenberghs to *Les Missions Catholiques*, dated Gubuluwayo, November 26th, 1880, we learn that on the 19th of that month two messengers had brought from Father Law full particulars respecting his perilous journey to Umzila's, to which allusion was made in our March number.*—After parting company with some English hunters at the Poort defile of the Insimbi Mountains in S. lat. 18° 57′ 38″, E. long. 31°, the missionaries reached first the Little and then the Great Sabi River, and followed the left bank of the latter towards the south. In this part of the route the roads were extremely difficult, and they had more than once to cut a passage for their waggon, often making but five or six miles a day. In the country of the Mashona tribes, subject to Lobengula, they were well received and treated with friendliness, obtaining from them provisions at a moderate price in exchange for trade-goods, though they had to pay dearly for the numerous guides, whom they were obliged to engage from village to village in a country which appeared entirely unknown to their two Matabele guides. After they had crossed the Sabi, however, and set foot in the territory of the Mashonas who are nominally subject to Umzila, matters changed completely. The Indunas through whose districts they passed were more or less hostile, and matters gradually assumed a critical aspect. As the party struggled forward, their waggon was generally surrounded by groups of menacing savages, while others occupied the defiles as well as the fords of the Sabi and its small affluents, in order to embarrass the travellers and extort money from them. Though they hastened on as fast as possible to get out of their uncomfortable position, they scarcely advanced at all, only making some 50 miles in about a month. At length, on August 7th, they arrived at a most difficult pass, where they had to hew out the rock to level a passage for the waggon. All the missionaries and their Matabele guides were hard at work on this painful task, surrounded by a crowd of savages more insolent than ever, when suddenly they perceived that Père Wehl had disappeared. Instant search was made for him, and the Matabele guides spent three days in looking for him in the surrounding country, but without avail. The Mashonas assumed a more and more hostile attitude, and matters became so serious that, in order to avert a terrible catastrophe, it was resolved to abandon the waggon which hindered their progress, and which, indeed, they would have been obliged to give up in a very few days on account of the tsetse fly. Accordingly, at nightfall on August 10th, they started on foot by forced marches for Umzila's kraal, taking with them only what was absolutely necessary. The party, which was now composed of Père Law and Frères Hedley and Desadeleer, the two Matabele guides and two other natives, gradually got out of reach of their Mashona enemies, and followed the course of the Sabi by exceedingly difficult roads. They must have perished on the way, if they had not had the good fortune to find sufficient game for their support. On August 20th, worn out by fatigue and privations, and racked with the fevers so prevalent along the Sabi, they reached Umzila's kraal. They were received the next day by the king, who assigned them a small hut near his own, and furnished them with provisions. At the date of his letter (October 31st), Père Law's health was very much worse, and he feared that he would succumb, if assistance did not speedily arrive. Frère Hedley was in an almost equally feeble state, but Frère Desadeleer, who had escaped without fever, was strong and well, and had been sent by Umzila for the waggon, which it was reported has been left untouched by the Mashonas through fear of consequences. It was thought at Gubuluwayo that he might meet with Père Wehl, who was ascertained not to have been murdered on August 7th, but had got accidentally separated from his companions, and had not heard the signals they made; he had eventually made his way after great suffering to a kraal belonging to some people friendly to the Matabele. This is stated to be the village of Guddu, situated on the right bank of the Sabi, about half-way between Zimbaoë and Umzila's kraal. —We further learn from Mr. A. C. Baillie (Colonial Surveyor in South Africa) that the mission had sustained a serious loss in the death of Father Leronde, who was so excellent a linguist that it is said he seemed to acquire languages by instinct; that Father Law was lying dangerously ill at Umzila's, and that Father Depelchino had made a journey to the Zambesi, which appears to have been not very successful.—Mr. Baillie himself was planning a visit to the region near Sofala, for the purpose of exploration and survey; and he says that of all South Central Africa, the part between the Zambesi and the Limpopo, from Shoshong on the west to the shore of the Indian Ocean, is now the most worthy of attention.

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* See *ante*, p. 177.

The River Lufigi.—An expedition sent by the Sultan of Zanzibar to examine the upper course of the Lufigi had just returned on the departure of the last mail. The Sultan had entrusted the command to Mr. Beardall, a young Englishman, who had previously accomplished successful journeys further south in the Rovuma country, and had for some time under his charge the management of the Dar-es-Salaam road. Mr. Beardall's report and map will reach us in due course. Meantime we learn that the general result of his exploration is to show that the Uranga tributary, above its junction with the Lufigi, is for the first 80 miles of its course obstructed by rocks and rapids, and is therefore quite useless as a fluvial route into the interior. The country through which it flows proved also to be barren and thinly peopled.

Dr. Kirk's Visit to the Dar-es-Salaam District in East Africa.—Early in the present year Dr. Kirk made an interesting journey, in company with Captain Foot, R.N., along the road recently made at the private cost of Mr. Mackinnon and Sir Fowell Buxton towards the interior of East Africa from Dar-es-Salaam. The line of country visited extended for about 90 geographical miles inland, in a W.S.W. direction, passing across the country inhabited by the Wazaramo. The party first traversed the whole length of the road, a distance of 73 statute miles, and then crossed the river Kingani, or Ruvu, and proceeded as far as Kidunda and Gongorogo, on the borders of Khutu. With regard to this road, Dr. Kirk reports that it is well constructed, and will require little to keep it open, and that as a philanthropic undertaking it has been eminently successful, its civilising influence on the people through whose country it passes being very apparent. He remarks, however, that it has not, as yet, reached any highway of commerce, and that the local trade, though fast increasing, is still small. The presence of the tsetse fly in the country 40 miles from the coast, further renders the employment of horses or bullocks as beasts of burden out of the question; the belt of fly-country is, in fact, here wider and more continuous than it is further to the north. The Wazaramo are one of the most degraded and troublesome of the tribes on the coast, and before the country had been opened up it was unsafe for any but an armed party to attempt to pass. But their utter weakness has become manifest since the road was made, and any one may now travel along it unarmed and without danger of molestation. Dr. Kirk noticed that along many miles of the road they had formed extensive fields and had commenced to settle in open and cleared places, abandoning their stockaded villages in the jungle whence they formerly used to issue to waylay and extort payment from travellers. As a trade-route to Nyassa, he believes the road will never be of great use, as there are steep slopes and lofty mountain-plateaux to be crossed before the shores of the lake can be reached, while the intervening country appears to be poor and thinly peopled. He thinks that the trade of the Nyassa district is more likely in future to pass along the Shiré and Zambesi, and that the road might be easily made the great exit for the land trade of Unyamwesi, Ujiji, and surrounding countries, which now passes to Bagamoyo, on account of the great advantages offered by Msasani Bay and Dar-es-Salaam together as a port of shipment.—On this journey Dr. Kirk was able to determine more accurately the plant which yields the best East African indiarubber, and to obtain seeds of the species for introduction into India. It occurs in great abundance along the line of route, apparently but little affected, except in the immediate neighbourhood of the villages, by the reckless mode of tapping employed. He was told that in many parts a native may still collect three pounds of rubber daily. He found five species, but only one of them is thought worth tapping.—The other great staple of the district is gum copal, which is found in many parts. It seemed that this semi-fossil resin exists, even in the richest diggings, only in patches, as though it had been produced by isolated trees. The natives appeared nowhere to work the country systematically, but to sink test-holes, and, on finding traces of the resin in any part, to work that thoroughly. In many places these test holes had been made and the place abandoned as useless although not far off a patch had been well worked. The gum, now found underground usually in red sandy soil, is undoubtedly the produce of the same species of tree as still exists in these jungles, which now yields an inferior sort of resin; the difference between the two being the consequence of age and a chemical or molecular change effected by time. The copal tree grows throughout the Uzaramo country, and is by no means confined to the sea-coast, but is even more abundant inland beyond the first coast-ridge. It was not seen, however, at Kidunda, where the geological formation changes, and the old limestone rocks of the interior first appear.

Depression of Level in the Waters of Lake Nyassa.—In the Livingstonia Mission Report for 1880, we find the following interesting observations on the alteration of level in the waters of Lake Nyassa:—"Since 1875 the low-water level of the lake has year by year been falling, till in December 1880 it was three feet below that of December 1875. Should this decrease continue, the matter will soon become serious during the dry season, with regard to the navigation of the southern end of the lake, at the entrance to the Shiré, and still more so at the northern extremity of Lake Pamalombé, which indeed would probably soon become another marsh, similar to Morambala; and the Upper Shiré, hitherto affording such a good waterway, would have its navigation interrupted by snags and sand-banks, while the *Ilala*, already requiring careful steering among the shallows, would be confined to the lake. It is rather curious to note, as a contrast to this, the rise of level taking place on Lake Tanganyika."—It should be remarked, in reference to this, that the rise of level which had been going on for a series of years in Lake Tanganyika, has, according to Mr. Hore, been changed into a depression, since the reopening of the outlet, two years ago, by the Lukuga. These cyclical changes are probably dependent on the rainfall over the districts comprehended in the basins of the lakes; but long-continued and accurate observations are required in order to settle this curious question.

Mr. Comber's Expedition to the Upper Congo.—Nothing dismayed by the hostile reception he met with on his previous attempt to reach the navigable waters of the Middle Congo from S. Salvador, the Rev. T. J. Comber is preparing for another journey in the same direction. He writes (January 5th, 1881):—"We are making a great effort to reach Stanley Pool. To-morrow two of my colleagues start for Mussuca on the river, to try the north bank, the same on which Stanley is advancing; and on Monday my third colleague and myself leave S. Salvador to try again the Makuta route, although it was at Makuta that I was shot in September. There has been a big palaver on the subject, lasting three months. It is settled now quite satisfactorily, and we are starting off again under hopeful circumstances, and with a good staff of carriers. I trust this time to succeed."

New German Expedition to West Central Africa.—The expedition of Dr. Pogge and Lieut. Wissman, mentioned in a former number of the 'Proceedings,'* as preparing to leave Europe under the auspices of the German African Society, left São Paulo de Loanda for the interior in January last. Their destination is Mussumbe, the capital of the Muata Yanvo, and their route will be viâ Dondo, Malange, and Cassange. We learn that it is their intention to remain three years at the town of the great African potentate, for the purpose of accustoming the natives to white people, and eventually of obtaining the monarch's consent to the establishment of European trading factories, which is the principal object of their mission. The expedition is said to be financially aided by the King of the Belgians. Dr. Pogge is favourably known for his former successful journey to the Muata Yanvo's dominions, and the valuable zoological collection he brought thence to Europe.

French Expedition from the Senegal to the Niger.—Among the documents lately received by the French Government from the members of Captain Gallieni's expedition, the safety of which we reported in our March number,† are a report by Lieutenant Pietri on the affluents of the Upper Senegal, and a map based on a compass survey by Lieutenant Vallières of the region between the Senegal and the Niger, nearly 1000 miles in extent. Near Bamaku the line of water-parting was found to be comparatively low and to lie at a very short distance from the Niger. It was also proved that the streams which have been previously laid down on maps as flowing into the Niger in this region, have no existence, and that all the rivers of any consequence which were met with, were affluents of the Senegal. The expedition had also collected some information concerning the Buré country. They report that there are ten villages, and that its population amounts to about 6000, of whom a sixth are engaged for some months in the year in gold-washing.

Dr. Riebek's Expedition to the Island of Socotra.—Dr. Riebek, whose scientific journey round the world was briefly referred to last month,‡ left Cairo with his party early in March for the island of Socotra, after recovering from the effects of his twelve days' journey in the Arabian Desert in company with Dr. Schweinfurth. He intends to spend three months in the island. Dr. Schweinfurth accompanies the party for the purpose of making a scientific investigation of the fauna and flora.

Bolor or Bilaur.—The vexed question regarding the identification of Bolor or Bilaur, which has exercised the minds of Central Asian geographers for so long, has received a remarkable enlightenment from Major Biddulph in his recently published work, 'The Tribes of the Hindoo Koosh.' It may be remembered that the name has been

* Vol. ii. p. 778.

† See *ante*, p. 176.

‡ See *ante*, p. 244.

applied loosely to a village or mountainous tract, the precise site of which was variously assigned to the west of Pamir, to Chitral, or the vicinity of Gilgit. In his edition of Marco Polo, Colonel Yule was led to attribute the first of these three positions to a place and small mountain state called Bolor, but subsequently we believe this eminent authority changed his opinion, and was induced to expunge Bolor altogether from the map. Still the evidence, though perhaps not precise, was strong. Hwen Thsang refers to the Pamir under the name of Po-mi-lo and to Po-lu-la, which he says lies south of the former, and which is supposed to represent Bolor. An early Mahommedan writer, Abdullah-i-Khurdadbih, quoted by Major Raverty, and who himself refers to Abu-Zaid, the Hakim, says that the boundaries of Chin (the dominion founded by the Shins in Baltistan, Gilgit, and the adjacent regions) were Khutan, Hindustan, Bilaur, and Yajuj Majuj. Bilaur (which, be it observed, means crystal, and was applied both to regions yielding that product and to the crystal-like glaciers and peaks of those parts) is also mentioned *passim* by the author of the Tabakat-i-Nasiri, and in the Tables of Nasir-ud-Din it is placed in lat. 37° and long. 108°, a position which would bring it between Balti, Yasin, and Sirikol. It is mentioned as a *kohistan* or highland in the annals of Kashmir, and Muhammad Haidar, who places Balti between Tibet and Bilaur, refers to the latter with some precision several times, viz. as between Badakhshañ, Kabul, Kashmir, and Yarkand, and as adjoining the mountain skirts of Yarkand, such as Raskum and Tagh-dum-bash, &c. Besides these authorities, most of which Major Raverty has diligently investigated, Klaproth cites the Chinese Imperial Geography to show that it lay south-west of Yarkand and east of Badakhshan, and rendered tribute to China, and Marco Polo also speaks of it, though there is *primâ facie* some difficulty in reconciling his exact bearings with the previous data. The general effect of this information seems, however, to point to a small highland state about the locality of Hunza and Nagyr. And this is precisely where Major Biddulph has run the fugitive name to earth. In his work (p. 146) he says: "There can be little doubt that it is to Iskardo we must look for the centre of the ancient kingdom of Bolor, as suggested by General Cunningham. In Gilgit, Hunza, Nagyr, and all the valleys to the westward, the name Iskardo is almost unknown, and the place is called 'Palor,' 'Balors,' and 'Balornts,'" though the Iskardo people themselves ignore the name and trace the derivation from Alexander, whom they claim to have been the founder of the town. This is a gratifying identification of a place which has long baffled students of Central Asian geography. Further, we may remark the disposition to assign Bilaur a place west of Pamir is not groundless, for the Yarkand Mission surveyors report of a place called Bilaor Bas, a little west of the Great Pamir, which suggests an explanation of the double site.

New Map of Gilgit and Chitral.—The new geographical information to be derived from Major Biddulph's work, cited in the foregoing paragraph, is not very extensive, but a capital map on the scale of 16 miles to the inch accompanies it. It is compiled by Colonel H. C. B. Tanner, who has done one if not two seasons' surveying round Gilgit. The most important additional features are the delineation of several valleys leading down from the crest of the Hindu Kush to the Chitral or Kashkar river, corrections of the Wurshigum and Karumbar valleys, and a good deal of information regarding Hunza and Nagyr, showing how easy must be the transit across the watershed into the basin of the Yarkand river, where the Hunza people were until lately in the habit of raiding. There are also great additions to the topography of the Panjkora, Swat, and Indus valleys, derived no doubt from the natives who travel freely between these localities and British territory.

The Eastern Frontier of Tibet.—At a recent meeting of the Bengal Asiatic Society, the well-known missionary traveller, Abbé Desgodins, read a geographical note on the eastern boundary of Tibet, which, as he remarked, is almost unknown, because it has been drawn through a country inhabited by people of the same race, who are subjected to the same Chinese government, though in a different manner. Père Desgodins takes as his starting-point the Upper Assam country near the Brama-kund, and passing eastwards dwells somewhat on a small tract of country, about 60 miles square, between 28° and 29° N. lat., and from the foot of the Mishmi Himalaya to the Salween, or Lu-tsze-kiang, because through it the great river of Tibet, the Yar-kiu, best known as the Sanpo, must flow, if it goes down to the Irawady. On this subject, however, he says he has been told over and over again by natives, well acquainted with the country, that there are only small rivers in it. A little below 28° N. lat. the frontier of Tibet crosses the Salween, and ascending a very steep spur on the left bank, reaches the main ridge of the mountain range between the Salween and the Mekong. This range is very narrow, steep, and rocky, the rivers being at a height of about 6000 feet above sea-level, the passes more than 12,000 feet, and the numerous snowy peaks from 18,000 to 20,000 feet. One of the most southern of these, named Dokéla, is of great importance, not only from its being a celebrated place of pilgrimage for devotees from Eastern Tibet, but also because it may be considered as the most southern boundary of Tibet Proper, the frontier line of the Chinese province of Yünnan being only a few miles below it. Some fifty years ago the boundary wall followed the ridge of the main range as far to the north as 29° 20′ N. lat., but owing to various causes the Tibetans took possession of the eastern slope from 28° 30′ up to 29° 20′ N. lat., so that the Mekong becomes the frontier. The only exceptions are the two villages of Kiata and Dachu (29° 2′ N. lat.) on the right bank, which are kept by Bathang and China on account of the salt-pits. On the left bank the Yünnan province reaches to nearly 29° N. lat., and then comes the Bathang territory, which is part of the province of Szechuen. About 29° 20′ N. lat. the boundary crosses to the left bank of the Mekong, ascends a subsidiary mountain range to the main range, and then following an E.N.E. direction, passes between the villages of Bom and Lanten, the former in Bathang territory, and the latter in the Kham province of Tibet Proper. Before the eighteenth century this province extended to 102° or 103° E. long., but then, after an unsuccessful rebellion of the Tibetan lamas, the twenty-two eastern Tibetan principalities were absorbed into the provinces of Szechuen and Yünnan. From about 30° N. lat. the eastern boundary of Tibet runs northwards between the Mekong and the Kin-sha or Upper Yang-tsze-kiang, but as undulating table-lands are there met with it is not so clearly defined as it previously was, and hence arise many disputes between the shepherds of Bathang and Tibet. However, Père Desgodins considers that geographically the boundary line may be taken as following the watershed as far as 33° N. lat. Then it turns to the north-west as far as 35° N. lat., 95° E. long., where it crosses the Upper Yang-tsze, and then it takes a north-easterly direction until it reaches the mountains round Koko-nor and the main range of the Kuen-lun. East of this boundary are the principality of Bathang, and further to the north that of Dégué, both under the direct administration of Szechuen; while on the west of it, and north of Kiang-ka, are the principalities of Chraya, Chamtu, San-che-kiu-tso, Réu-khié, and Nong-kine. Properly speaking, however, these do not belong to Tibet, nor do they acknowledge its authority, having chiefs of their own under the direct superintendence of one of the Chinese representatives at Lhassa, so that, according to Père Desgodins, from 30° N. lat. the boundary line might well have been set about two degrees more to the west.

The Sanpo of Tibet.—In the discussion which followed the paper referred to in the previous note, Major-General Walker called particular attention to the fact that Père Desgodins had resided for three years in the valley of the Lu-tsze-kiang or Salween (about N. lat. 28°)—at an estimated distance of 100 miles from where the Brama-kund enters Upper Assam—which was a most favourable position for making inquiries whether any large river flows through the intervening region. This, of course, must be the case, if the Sanpo flows into the Irawady, as has recently been again urged by Mr. Robert Gordon, of the Public Works Department in Burma. On this very interesting geographical point Père Desgodins furnished several reasons for concurring in the now almost general belief that the Sanpo is not the upper course of the Irawady, but of the Brahmaputra. The following, in brief, are the reasons he put forward:—(i.) He had been told that the district of Dza-yul, through which it would have to flow to the Irawady, is a rich agricultural country, and therefore a low one, probably not more than 6000 feet above the sea-level, while to the south of it is a high, uncultivated table-land, through which it is impossible to imagine that the Sanpo could flow in a ravine 3000 or 4000 feet deep. (ii.) If there were two high table-lands, divided by a large river, this fact could not escape the notice of the inhabitants of the region, and they are unanimous in saying there is no such river. (iii.) Important information was also furnished by a lama at Bathang. This man went on a pilgrimage to the sacred lake Tsomapang (Mansarowar of our maps), where the Sanpo has its source, descended the river as far as Lhassa, where he lived for many years, and in returning to Bathang followed the Sanpo as far as a savage tribe, called by the Tibetans Lhopa (inhabitants of the south), or Lho-kha-chra (tattooed inhabitants of the south). From what he stated about this tribe, Père Desgodins has no doubt that they are the Abords. There, the lama stated, the Sanpo takes a southerly direction through an awful split in the hills, where it flows overhung by perpendicular rocks; he was told by people of the country that, after flowing for some distance through this precipitous channel, the Sanpo ended in an immense waterfall; he further maintained positively that the Sanpo flowed to the south and not to the east, not towards Dza-yul, which he knew well, but through the country of the Abord tribe. (iv.) In regard to the objection that the body of water in the Irawady is so great that its sources must be much higher than 28° N. lat., Père Desgodins replied that the Irawady, having its origin there, is entirely in the zone of very rainy countries, which sufficiently accounts for its volume.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Ninth Meeting, 28*th March*, 1881.—The Right Hon. Lord Aberdare, President, in the Chair.

Elections.—*Arthur D. Bayles, Esq.; M. Davis, Esq.; Thomas Frazer, Esq.; Lieut.-Colonel Casimir Stanislaus Gzowski; Alexander Ronald Grant, Esq.; Henry W. Johnston, Esq.; Malcolm Laing Meason, Esq.*

The following paper was read:—

"Eastern Bolivia and the Gran Chaco." By J. B. Minchin.

The paper, illustrated by a map from original materials supplied by the author, will be published in the June number of the 'Proceedings.'

Tenth Meeting, 11*th April*, 1881.—General Sir H. C. Rawlinson, K.C.B., Vice-President, in the Chair.

Elections.—*William Ashdown, Esq.; William Busk, Esq.; Alfred C. Stenning Draper, Esq.; Count Hoyos; David Lowe, Esq.; Percy Schneider, Esq.*

ANNOUNCEMENT OF THE AWARD OF THE ROYAL MEDALS FOR THE YEAR.

On the opening of the meeting, the Chairman said that before proceeding to the regular business he wished to announce that the Council had that day awarded the Royal Medals, of 1881, for the promotion of Geographical Science and Discovery, as follows:—

The Founder's Gold Medal to Major Serpa Pinto, for his remarkable journey across Africa, from Benguela to Natal, during which he explored nearly 500 miles of new country, defined the fluvial systems of the southern slopes of the Benguelan Highlands, and fixed the position of numerous places by a series of astronomical observations; also for the admirable account of his journey, now in course of publication in London, containing numerous original maps, tables of observations, and a large amount of valuable and exact information regarding the African interior.

The Patron's Gold Medal to Mr. Benjamin Leigh Smith, for having, in a steamer built and fitted at his own expense, for the purpose of Arctic exploration, made important discoveries along the south coast of Franz-Josef Land; and for his previous geographical work during three former expeditions, also equipped by himself, in the first of which he made discoveries along the north-east land of Spitzbergen.

Mr. R. N. Cust then read a paper which had been communicated to him by Colonel H. C. Tanner, entitled:—

"The Chugáni and neighbouring Tribes of Kafiristan and their Country." *Vide supra*, p. 278.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—April 1st, 1881: Reception of Dr. Oscar Lenz.—In the unavoidable absence, through indisposition, of the President, Admiral Baron de la Roncière le Noury, the chair was taken by M. Milne-Edwards.—The Chairman opened the proceedings with an address, in which, after referring to Dr. Lenz's previous explorations on the Ogowé, he stated the circumstances under which his recent expedition in North-West Africa was undertaken. He then called upon M. Henri Duveyrier—himself a well-known explorer of the Sahara—to give a sketch of previous journeys to Timbuktu.—M. Duveyrier thereupon read a memorandum on this subject, of which the following is a *résumé*:—

Paul Imbert.—Until 1630 Timbuktu was known to Europeans only by name. The narratives of the early Portuguese navigators and conquerors of West Africa spoke of a great market, the name of which was given sometimes as Tungubutu, and sometimes as Tombut. In the year named, Paul Imbert, a French sailor, fell into the hands of the Moors after being shipwrecked, and was the first European to reach this metropolis of the Niger region. He was never able to give an account of his visit, as he died in slavery in Morocco.

Alexander Gordon Laing.—After his return from a journey in the region of the sources of the Niger, Major Laing started from Tripoli for Timbuktu in 1826 by way of Ghadamès and In-Çalah. Having been attacked and seriously wounded in the Wadi Ahenet by the Ahaggar Tuaregs, he took refuge at El-Hillé with a family well known for the kindness they have shown to Christian travellers in Western Nigritia. With their assistance he was able to reach Timbuktu, and leave again after a short stay. He was murdered near Arawân, through the treachery of his guide, and not a word that he wrote on the subject of Timbuktu has ever reached European hands.

René Caillié (1828).—It was reserved for a Frenchman, M. René Caillié, to bring back the first description from personal observation of this interesting town, and of the two routes which connect it with the seaboard of Africa. To prepare himself for his journey, M. Caillié spent some time among the Terarza Moors, learning the life of the desert, and sufficient of the religion, language, and customs of the Mussulmans, to enable him to travel in disguise. He started with but slender resources from the Rio Nunez, giving himself out as a Mussulman from the East, who, having fallen into the hands of the Christians, had succeeded in escaping, and was desirous of returning to his native country. His dangerous stratagem was successful, and in 1828 he reached Jinni, on the Niger; he there took boat, and ascended the river to Timbuktu, laying down his route by compass-bearings. His return journey was through the Sahara and Morocco to Tangier.—Doubts, which are said to have originated in England, were thrown upon the truth of M. Caillié's statements regarding his journey, and cast a shadow upon the last days of the traveller, who soon succumbed to the fatigues and privations he had gone through.

Heinrich Barth (1854).—Twenty-six years later these doubts were set at rest by the celebrated German traveller, Dr. Barth, whose journey to Timbuktu was undertaken under English auspices. Dr. Barth travelled in disguise like his predecessor, and started from Tripoli on his expedition (for which in 1856 he received the Patron's Medal of the Royal Geographical Society.—See R. G. S. Journal).

Mordokhai Aby Serur (1857).—Between 1854 and last year there still remains a name to be mentioned. M. Beaumier, a French Consular officer, communicated the account of the journey to Timbuktu, made by a French *protégé*, the Rabbi Mordokhai, which was published in the Society's *Bulletin* in 1870 (p. 349).

Dr. Lenz then addressed the Meeting on the subject of his journey from Tangier to Timbuktu and thence to the Senegal. [We give below a summary of Dr. Lenz's previous address to the Geographical Society of Lyons on March 27th, and hope to furnish a full account of his labours in a future report of the proceedings of the Geographical Society of Berlin on April 13th.]

Geographical Society of Lyons.—March 27th, 1881: M. Louis Desgrands, President, in the Chair.—The meeting, which was numerously attended, was specially convened for the reception of Dr. Oscar Lenz on his return from Timbuktu. —In introducing Dr. Lenz to the Meeting, M. Desgrands delivered an address, in the course of which he referred to the explorer's previous services to geography and to the travellers who had preceded him in the region he had recently visited.—Dr. Lenz commenced his lecture with a sketch of the labours of Major Laing, M. René Caillié, and Dr. Barth. He stated that he had penetrated into the centre of Africa by way of Morocco, and after crossing the Atlas and anti-Atlas, had entered the region of sand-downs, where it would be difficult, not to say impossible, to create the interior sea, of which some theorists have dreamed. The centre of Africa is not, as had been generally thought, an immense sandy plain, but chains of mountains are met with there, as well as plateaux of some extent and varying in height from 500 feet to 1000 feet above the level of the sea. There also are found great masses of rock, and quarries of porphyry and mineral salt, in which the inhabitants of Morocco and the Tuaregs carry on an extensive trade by the aid of the 40,000 camels which traverse the desert in the course of the year. The interior of the Sahara, moreover, abounds in wells, and apparently there is no difficulty about the supply of water.—Timbuktu is not the capital of the Arab tribes of this region of Africa; there are other towns of greater importance in the direction of the Sudan. It owes its importance to its market and to the fact that the various Arab tribes, and notably the Tuaregs, recognise in it a strategical position in which to establish their supremacy. Dr. Lenz was received at Timbuktu with great kindness by the inhabitants; and he observed that their principal trade is in ostrich feathers, ivory, and coral; that there are mosques and very good libraries there; and that the town is about three miles from the Niger, but has a small port on the river, named Kobra. On the subject of a Trans-Sahara railway, he said that it would be a work of great political, technical, and commercial importance, but would meet with great hostility on the part of the native tribes, who would do all in their power to hinder its construction.—From Timbuktu Dr. Lenz proceeded to the French post of Medina and thence to St. Louis.—After the delivery of this address, M. Desgrands begged permission to put some questions to Dr. Lenz in the name of the Society, and asked whether the opposition to the construction of a railway would come from the people of Timbuktu and the tribes of the desert, or from the chiefs simply.—Dr. Lenz replied that the opposition would come from the people rather than their chiefs, as it would do away with the 40,000 camels by which trade is now carried on between the chief towns of the Sahara.—At the close of the meeting, the President, amidst loud applause, awarded the great medal of the Society to Dr. Lenz for his eminent services to geography.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Balearic Isles.—Die Balearen. In Wort und Bild geschildert. Dritter Band, erste und zweite Hälfte. Die eigentlichen Balearen. Leipzig (Brockhaus): 1880, 2 vols., imperial 4to., pp. 1–508, 509–931. Maps, coloured illustrations, woodcuts.

This continuation of the sumptuous and exhaustive work published anonymously by the Archduke Ludwig Salvator of Austria, refers to Mallorca, of which it discusses chiefly the general industrial and economic aspects, giving also much detail. The maps represent the roads existing in 1870 and the coal-bearing nummulite-formations in the centre of the island. Vol. ii. appeared in 1871. The excellence of the illustrations is as conspicuous in this work as in its predecessors.

ASIA.

Biddulph, Major J.—Tribes of the Hindoo Koosh, Calcutta (Office of Superintendent of Government Printing): 1880, 8vo., pp. vi., 164, and clxix., pls., tables, woodcuts, map in cover.

The author, British political resident at Gilgit, has during the last six years visited many countries on both sides of the eastern portion of the Hindoo Koosh range, some of which have never before been visited by any European. In 1873, he accompanied Sir D. Forsyth to Kashgar, and in the following year crossed the Pamir and visited Sirikol and Wakhan. In 1876, he visited Gilgit, Hunza, and part of Yassin, and in 1878 Yassin and Chitral. He here records everything deemed worthy of general interest regarding those countries and their inhabitants, avoiding as much as possible any repetition of former writers such as Shaw, Drew, and Leitner. The general observations apply as a rule to Gilgit. The inaccessibility to travellers of the country between the 35th and 38th parallels of latitude, and 70th and 76th degrees of longitude is attributed to its peculiarly mountainous nature, and partly also to its valleys being narrower at the mouths than higher up.

Though chiefly of ethnological interest, this treatise is a valuable contribution to the scanty information we possess upon Kafiristan, Yaghestan, Kohistan, Baltistan, and the other countries south of the Hindoo Koosh, included in the general name of Dardistan.

The map, photozincographed at the office of the Trigonometrical Survey of India, is a compilation by Col. Tanner from native information supplied by Major Biddulph, and based on the latest surveys. It comprises the territory between Cabul and the Mustagh pass to the east, and from Jalalabad to Kila Wamar on the Ab-i-Panjah branch of the Oxus to the north.

Marvin, Charles.—Merv, the Queen of the World; and the Scourge of the Man-stealing Turcomans. With an exposition of the Khorassan question. London (Allen): 1881, 8vo., pp. 451, maps, portrait. *Price* 18s.

A comprehensive compilation, dealing with the current political Central-Asian question. Some Russian information now first placed before the public is given. The maps are of no geographical interest or importance, but serve to illustrate the different political arguments of the text.

A list of authorities quoted is supplied.

Schweiger-Lerchenfeld, Amand von.—Der Orient. Wien (Hartleben): 1881, 8vo., illustrations. (*Williams & Norgate.*)

The commencement of a popular illustrated work on the East, to be completed in 30 parts at 9*d.* each.

Walker, Colonel J. T.—Synopsis of the results of the operations of the Great Trigonometrical Survey of India. Vol. VII. Descriptions and Co-ordinates of the Principal and Secondary Stations and other fixed points of the North-West Himalaya Series (or Series C of the N.-W. Quadrilateral), and the Triangulation of the Kashmir Survey; pp. lxxiii., 293 (1879). Vol. VIII. Descriptions and Co-ordinates of the Principal and Secondary Stations and other fixed points of the Great Arc, Section 18° to 24°, or Series A of the South-East Quadrilateral; pp. xiv., 66 (1878). Vol. IX. Descriptions and Co-ordinates of the Principal and Secondary Stations and other fixed points of the Jabalpur Meridional Series, or Series E of the South-East Quadrilateral: pp. vii., 37 (1878). Dehra Dun: 4to., maps.

AFRICA.

Holub, Emil.—Seven Years in South Africa: Travels, Researches, and Hunting Adventures, between the Diamond-Fields and the Zambesi (1872–79). Translated by Ellen E. Frewer. London (Sampson Low & Co.): 1881, 2 vols., 8vo., pp. 426 and 479, map, illustrations. Price 2*l.* 2*s.*

The English translation of the original work noticed at p. 61 of the present volume. The general map only is reproduced.

Serpa Pinto, Major [Alexandre de].—How I crossed Africa: from the Atlantic to the Indian Ocean, through unknown countries; Discovery of the great Zambesi affluents, &c. Translated from the Author's Manuscript by Alfred Elwes. London (Sampson Low & Co.): 1881, 2 vols., 8vo. Vol. I. "The King's Rifle," pp. xxiv., 377; Vol. II. "The Coillard Family," pp. 388: 15 maps and facsimiles, 132 illustrations. Price 2*l.* 2*s.*

This long expected work, the publication of which has been deferred in consequence of the author's serious illness, will doubtless obtain a wide popularity, from its appealing to classes of readers of a very varied nature. The general public will find attractive material in Major Serpa Pinto's narrative of his numerous personal adventures, which is told in a certain piquant and unstudied style different from that of most explorers,—the mere mechanical part, with its numerous initial dedications, explanations, &c., and double title (that of the first volume running over the first half of the second), being a novelty. The artless individuality of the writer, moreover, gives an impress of fidelity to his observations. Without being professedly devoted to ethnology, botany, or zoology, the author never fails to depict or record anything likely to interest students in those branches of natural science, so that his volumes are a storehouse of facts and illustrations.

To geographers, the exactness of his astronomical and other observations during the journey from Benguela to Bihé and the Zambesi, and the discoveries of various affluents of that river and definition of the fluvial systems of the southern slopes of the Benguelan highlands, have already sufficiently recommended him, having procured for him the highest recognition possible in this country. The enumeration of the scientific instruments forming part of the equipment of the expedition shows indeed that no mere random exploration was intended.

A chapter, commencing on p. 216, vol. i., under the heading "Rapid retrospective glance," gives the purely geographical results of the journey as far as the left bank of the Quanza in Bihé, of which the details are given in the preceding part of the volume, which contains the account of the author's proceedings in company with Messrs. Capello and Ivens. This chapter contains the results of the observations by the two latter gentlemen from the coast to Caconda, and by the author from Caconda to the Quanza, recalculated by Mr. Sugden and verified by an observation of the transit of Mercury at Belmonte. Some tables of climatic and meteorological importance are also given; and the general features of the country as far as the Quanza are succinctly recapitulated, with the ultimate opinion that it approximates to the Transvaal in the way of climate, with a more fertile soil, far more condensed and agricultural population, deficient mineral wealth, richer woods and forests, equally good pasturage, and a probably more prosperous future from its easy communication with the rich countries of the interior.

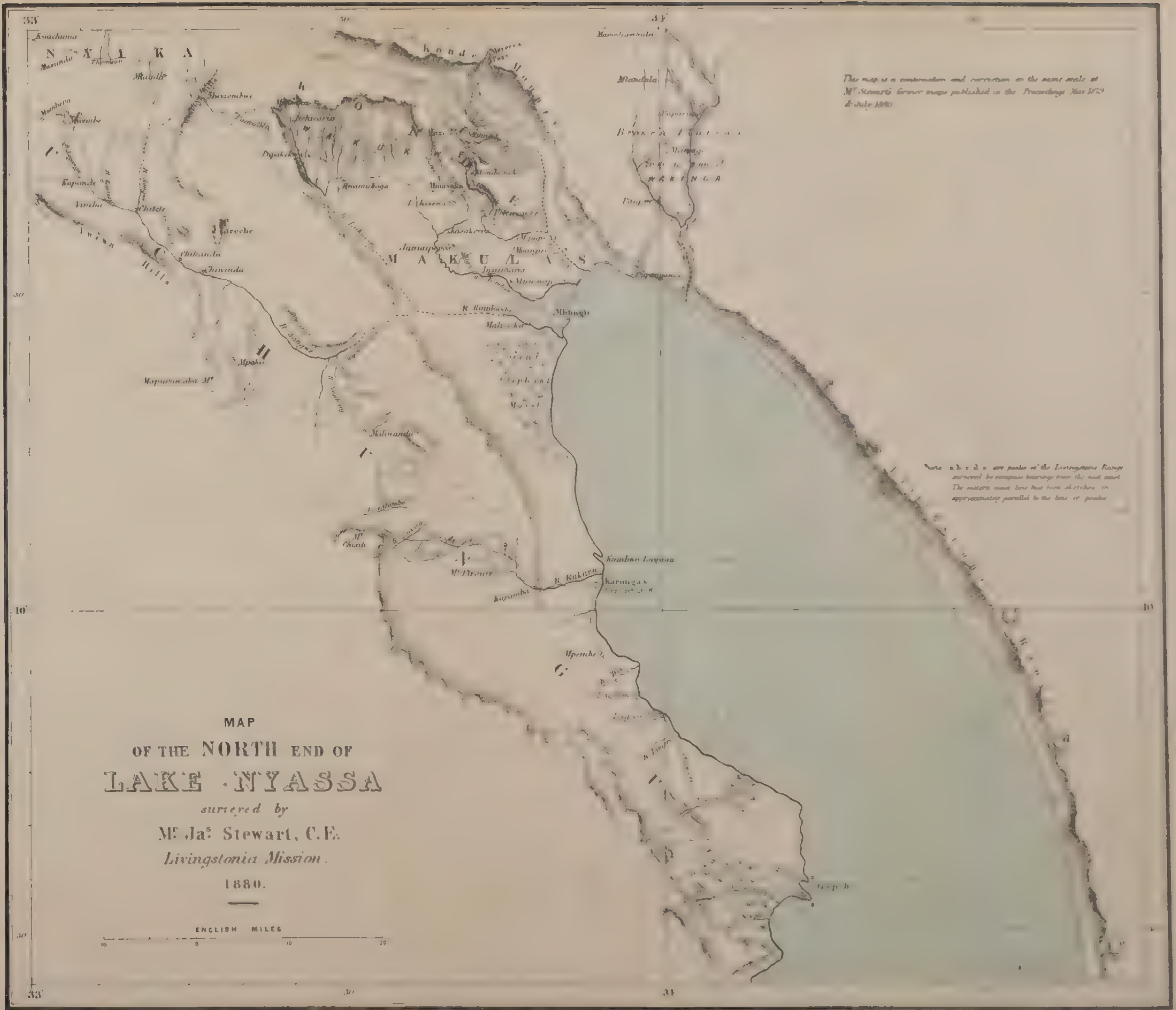
The remainder of vol. i. is occupied with the journey from the Quanza to the Zambesi, among the Ganguellas and Ambuellas, and the author's experiences on the Upper Zambesi among the Barotse follow in the earlier part of vol. ii., the "King's Rifle" portion ending at p. 104 of that volume, which describes the arrival at Embarira on the left bank of the Quando, near the confluence with the Zambesi.

A supplementary chapter, similar in treatment to that above mentioned, here gives the broad results of Major Pinto's labours in the most interesting country between Bihé and this point,—a country practically entirely new, as no data beyond native accounts of it have hitherto been accessible to geographers. The author only claims to have established a firm and safe outline of this previously unknown territory, but to this must be added the accurate details afforded by his local observations during the acquisition of the materials for this sketch. He defines the water-systems of the Congo and Zambesi, with special attention to the Quando, the main affluent of the latter, which, with its chief feeders, he personally studied; his companions Capello and Ivens devoting their attention to one of the great tributaries of the Congo. The Quando and its affluents, navigable for the greater part, are stated to represent a total waterway of 1852 statute miles.

The different geological formations, distribution of tribes, habits of the people, and progress of civilisation are here also discussed, the author differing from Stanley in the belief that success attends the conversion of chiefs, and inclining to consider commerce the more effectual agent. Some corrections are made in Livingstone's rendering of the Upper Zambesi, and the extremely pestilential nature of its climate is strongly urged. Some astronomical, hypsometrical, and meteorological observations referring to the region between the Quanza and Zambesi complete this portion of the work.

The second part contains the author's visit to the Victoria Falls and his journey south from Daca to Shoshong and by the ordinary route to Durban. He found Shoshong more than 60 miles out of position, both its longitude and latitude being hitherto given wrongly in our maps; and he denies the possibility of the Great Macaricari salt lake draining towards the east coast by the Shua and Nata. Scientific observations of a like nature to those above mentioned are appended for the region between the Quando confluence and Transvaal; and a brief vocabulary of the four principal languages spoken between 12° and 18° S. lat., from coast to coast, with English equivalents, concludes the work, to which a full index is given.

The maps are, a large detached one of Tropical South Africa, showing the travellers' route (scale 56 miles to the inch); with section of elevations (vertical scale 3000 feet to the inch); and the following smaller maps, in the body of the work: from Benguela to Bihé (30 miles to the inch), from the Cubango to the Quanza (17 miles to inch), the Quimbandes country (7½ miles to inch), the complicated heads of the water-systems of the Quanza, Cubango, and Zambesi in Cangala (15 miles to inch), from Cambuta to the Cubangui (17 miles to inch), the marshy source of the Quando (350 feet to inch), from Cangamba to the Cuchibi in the Ambuella country (15 miles to inch), and a plan of "Mosi-oa-Tunia," the great Falls of the Zambesi. A facsimile is also given of the author's sketch-map of the Cangala water-puzzle.



This map is a continuation and correction on the same scale of Mr. Stewart's former maps published in the Proceedings May 1879 & July 1880.

Note. a b c d e are peaks of the Livingstone Range surveyed by compass bearings from the west coast. The eastern coast line has been sketched in approximately parallel to the line of peaks.

MAP

OF THE NORTH END OF

LAKE NYASSA

surveyed by

Mr. Jas. Stewart, C.E.

Livingstonia Mission.

1880.

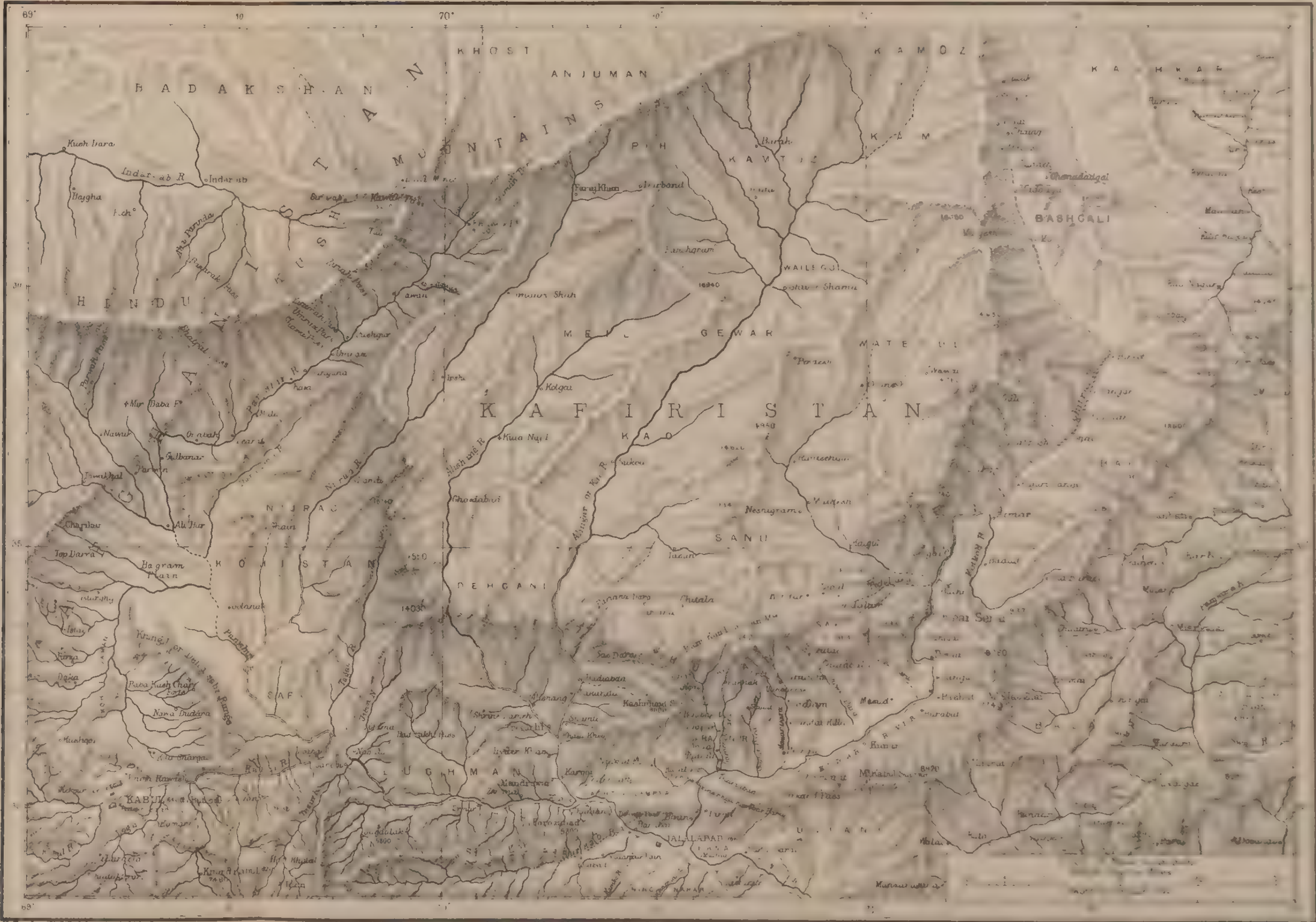
ENGLISH MILES

10 0 10 20

W. J. Turner, R.G.S. Del.

Pubd for the Proceedings of the Royal Geographical Society 1881.

MAP OF KAFIRISTAN.



H. Sharbau R.G.S. del.

Published for the Proceedings of the Royal Geographical Society by Edward Stanford, 55 Charing Cross 1881

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Lake Region of Sikkim, on the Frontier of Tibet.

By Sir Richard Temple, Bart., G.C.S.I., C.I.E., D.C.L.

(A Lecture delivered at the Evening Meeting, February 28th, 1881.)

Map, p. 384.

Sir Richard Temple spoke as follows :—

I am about to address you upon the subject of "The Lake Region of Sikkim, on the Frontier of Eastern Tibet." My address will consist mainly of an exposition of the map and of the pictorial illustrations which have been made for this purpose. The map has been prepared specially by our draughtsman, Mr. Turner. The coloured illustrations have been prepared on a large scale by my brother, Lieutenant George Temple, R.N., from water-colour sketches made by myself.

In the first place, I must ask you to observe that the district of Sikkim overlooks from the north the rich province of Bengal, and is situated in the eastern part of the Himalayas; and in the enlarged map of Sikkim before you, you will observe that a railway runs up from the direction of Calcutta, to the foot of the Himalayas near Pankabari. From the foot of the mountain there runs a road up to the hill station of Darjiling, which is the capital of British Sikkim. British Sikkim, you will perceive, is marked within the red line. It originally belonged to the Rajah of the native State of Sikkim, and was annexed to the British dominions by reason of his misconduct in imprisoning for several days Dr. Campbell, the British Superintendent of Darjiling, and Dr. (now Sir Joseph) Hooker, the Director of Kew Gardens. In punishment for such an offence, this district was taken from him and added to British India. Since its annexation to British India, the district has flourished immensely, and has become one of the principal seats of the tea industry of India. It is now dotted and studded with flourishing tea plantations.

Now from the station of Darjiling you get a view, 45 miles distant, of the celebrated mountain of Kanchanjanga. Kanchanjanga is one of the principal of a group of mountains upwards of 28,000 feet high, and is the second highest mountain in the world. But the celebrated view of Kanchanjanga is not the only claim which Darjiling has upon the attention of the world. It is well known that it is the summer headquarters of the Government of Bengal, and the hill of Darjiling constitutes a remarkable watershed. In the first place, it is a physical watershed, inasmuch as it constitutes the water-parting of the rivers Ganges and Brahmaputra: the water that flows from the south side of the crest, ultimately finding its way into the Ganges, and that on the north side running into the Tista, which is an affluent of the Brahmaputra. But it is also, if I may so call it, a moral and religious watershed, for every man on the south side of the crest is a votary of the Hindu religion, and every man on the north side is a Buddhist. On the south side of the crest the bell of the Hindu temple calls the faithful to prayer. On the other side begin the Buddhist monasteries and chapels, where the deep-sounding gong summons the votaries to worship; and considering that the Hindu religion numbers 250 millions and more of people, and the Buddhistic upwards of 400 millions, the circumstance that this particular crest should be the boundary line between these two wide-spread religions, constitutes a remarkable circumstance. Moreover, Darjiling has now become the entrepôt and the market of the Eastern Himalayas. At that point are gathered the piece goods and woollens, and other manufactures of England to be exported to Tibet: thither come in exchange the wools, the horns, the various products, the live-stock, the unrivalled sheep and goats, of Tibet. So much, then, for British Sikkim.

I must now ask you to leave the British dominions and to cross the red line on the map. We then arrive in Native Sikkim, on the western frontier of which there runs the important line of hills separating that State from Nepaul. This range has an average altitude of between 11,000 and 12,000 feet. You may ride along that ridge for 40 or 50 miles almost without a break. On your right hand, travelling northwards, you overlook the State of Sikkim, which is a labyrinth of hills; and on your left you have in view the valley of Nepaul. On your right front you see the Kanchanjanga, already described, and on your left front the famous group of snowy mountains, of which the highest is Mount Everest. Now, Mount Everest is more than 29,000 feet high—a few feet higher than Kanchanjanga, which is upwards of 28,000 feet; so that from that ridge of hills is obtained the finest view of snow mountains in the world. The vegetation is also very peculiar and beautiful, for besides the fir forests of the mountain slopes, there exist along that ridge the most beautiful rhododendron trees that have ever yet been discovered. The clusters of blossoms may be described in general terms as being as large as a man's hand, and the leaves from 12 to 13 inches long. The colouring is quite superb, sometimes crimson and sometimes alabaster white. But the most remarkable circumstance is that these splendid flowering shrubs grow in a climate peculiarly rigorous. The rains and the winds beat on them, the rich tints are soon bleached, and in a few days after, the blossom falls. It certainly adds to the extraordinary interest of this floral display to find it thus set forth amid some of the roughest and severest aspects of nature.

Along the centre of Sikkim lies the valley of the Tista, a river which rises in the central, backbone ridge of the Himalayas. I am not about to lead you this evening towards the source of the Tista, but I may refer those who are curious upon that subject to the very interesting description of the locality given, firstly, in Sir Joseph Hooker's book entitled 'Himalayan Journals,' and secondly in Mr. Blanford's description of a journey in that region. Both those gentlemen agree in describing the views at the source of the Tista as among the finest they ever beheld, and they are extremely good judges on such a subject, having seen some of the best views in the Himalayas. But the Tista may be regarded as the main artery of Native Sikkim, and all the streams which run through this series of valleys may be considered as veins leading to this main arterial line of drainage. Now, the interesting point, from a commercial and political point of view, is this: that through Sikkim the British Government is gradually constructing a trade road from Northern Bengal to Eastern Tibet, more particularly with a view of opening communication with Lhassa, the well-known capital of Eastern Tibet. This road is to pass through British Sikkim first, then Native Sikkim, then on to the Jyelap Pass, which is one of the passes leading over the Chola range of hills, and then into the valley of Chumbi, to which I will allude more particularly presently. This road is to start mainly from Darjiling as the British terminus, and we hope in future generations that it will end at Lhassa as the Tibetan terminus. It is to supersede the old road to Eastern Tibet which used to run through the State of Bhutan, a portion of which you will see indicated on the right-hand side of the map. This old route through Bhutan is the one that was followed by the early travellers who went upon political missions under the orders of that far-seeing statesman Warren Hastings, then Governor-General of India—such travellers as Turner, Manning, and Bogle. The interesting and instructive journals of Bogle and Manning have been recently published and edited by our talented Secretary, Mr. Clements Markham, who has prefixed to the work one of those interesting geographical, historical, and political discussions for which he has such a special aptitude.

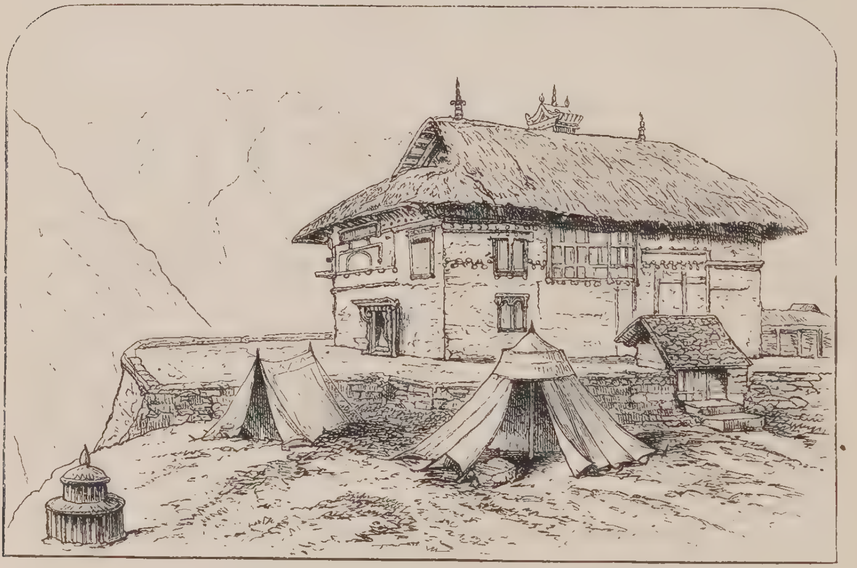
Before we proceed further, I must ask you to look more particularly in the map at the Chola range of mountains, and the Chumbi Valley. You will see that the Chola range lies in the north-east corner of Sikkim separating that native State of Sikkim from the valley of Chumbi. Now the situation of Chumbi, you will observe, is very peculiar, because it is a portion of Tibet interposed, as it were, like a wedge between Sikkim and Bhutan. It is a piece of Tibet, and therefore politically a piece of China, protruded in the midst of the Himalayas which pertain to the British empire. I will ask you to observe more particularly the details of this new road to which, as you will readily understand, great political as well as commercial importance is attached. First, then, it leads from Darjiling deep down into the valley of the Tista; thence crossing the Tista by a bridge—I say a bridge, because I believe it is built; at all events, I know that before I quitted the government of Bengal I sanctioned the design and the estimate, and provided the funds, and I believe that the bridge must have since been completed. Thence the road passes on to a place named Dhamsong, which we took from Bhutan after the last war. Then it runs down again into one of those deep valleys of the affluents of the Tista, where the rich vegetation, the tree ferns, the flowering creepers, the Bauhinia and blossoming trees like the magnolia, make you fancy yourself in Bengal and Assam, or even in Ceylon. From the midst of this exuberant vegetation, the proposed road rapidly mounts into altitudes where trees and foliage are seen no more.

After you leave this vegetation, you ascend into the rich pasturages and slopes of the spurs of the Chola range. There it is that the people of Chumbi and Tibet and the valleys of Sikkim bring their flocks and herds for what is called the winter grazing. Beyond the Himalayas the climate is too severe for the flocks in mid-winter, and therefore they are brought to lower altitudes of 10,000 or 12,000 feet, where the snow does not lie for more than a few weeks together, and where there is rich herbage. After that you ascend to the Jyelap Pass, at an altitude of about 15,000 feet, and thus you leave Sikkim and enter upon Tibet, which is virtually a part of the Chinese empire. Our engineers have marked the road out, and rendered it available for ordinary traffic as far as the Jyelap Pass, and beyond that it is of course for our friends in Tibet to continue it towards Lhassa. As may be imagined, there is a certain amount of reluctance on the part of the Tibetan authorities to construct these roads, because they sometimes believe, justly perhaps, that commerce follows the flag, and sometimes the flag follows commerce; therefore they think that politics have something to do with trade. Nevertheless, they highly appreciate the Darjiling market. They want money, and they know that they can bring their varied products to British markets for sale and obtain good British money wherewith to purchase British or Chinese articles. Therefore we hope they will co-operate with us at last in opening a trade route from India to China. It must be borne in mind that the crest of the Chola range, and the passes which cross that crest, especially the Jyelap Pass, are sterile in the extreme. The region lies above and beyond the zone of vegetation, and nothing is seen but bare rocks or water, snow and sky.

Thus far I have occupied you chiefly with what may be called the commercial and political portion of my address; I have not detained you much with descriptions of the picturesque scenery; but before I leave Sikkim proper, I should like to remind you of the extraordinary beauty which belongs to that isolated native State. Sikkim is not remarkable for the industry or the skill of its people; its population involves many ethnological questions which do not appertain to the sphere of the Geographical Society; but its religious condition is in many respects remarkably interesting to all Anglo-Indians, because it is one of the few places where an opportunity is afforded of seeing the living Buddhism, debased in comparison with the original Buddhism as promulgated by Buddha himself many centuries ago. The monasteries and Buddhist chapels in Sikkim are wonderfully interesting structures, and of very peculiar architecture—a mixture of Chinese and Indian; in certain respects it should be called a sort of Hindu-Chinese architecture. But beyond the architecture, there is the extraordinary beauty of the sites on which these buildings are placed. They are almost always on the crest of rocky and wooded hills, and they have as their background the glorious peaks of Kanchanjanga and the snowy range behind them.

From the altitude of most parts of this region an immense sweep of country is beheld. The deep valleys of the Tista and its affluents, not more than 2000 feet above the sea, lie below you, and from their depths you look up straight in one uninterrupted view to the summits of Kanchanjanga; so that, deducting 2000 feet from 28,000, you have in one sweep of the eye 26,000 feet of mountain slope, and that not in one place only, but in fifty places all over Sikkim. These and other circumstances, combined with the richness of the vegetation and the botanical interest connected therewith, also the many kinds of beautiful birds —this mixture of scientific and picturesque interest—have rendered Sikkim the desire of everybody to behold. The only drawback to travelling there is the severity of the weather. You have really to undergo great hardships. The mist and rain are provoking beyond my power of description. You have to march in the wet, to unpack your tent in the wet, to lie down to sleep in the wet, to pack-up again in the wet. For hours, sometimes for days, together you live in the wet; but after enduring all this you are ultimately rewarded, for the rain ceases, the blast subsides, and the mist clears away, and then you behold spectacles such as are imprinted on the tablets of your brain for the rest of your life.

I will now beg of you to follow me on the map along the routes leading to the lakes of Sikkim. The road I have already described was a straight route planned for commerce—the route, as it may be called, of the trader, of the statesman, and the politician, and I am now going to conduct you by what I may call the route of the artist. This route commences with an upper crossing of the Tista on the road leading northward from Darjiling. This is a very different crossing from the previous one I have described, and much more difficult; I very nearly had my riding ponies drowned at this spot. However, I and my staff got safely over, and commenced the ascent of the low hills over which the road lies, until we reach a point opposite Tumlong, whence we descend to a river, then re-ascend to Tumlong, and afterwards descending again to the river and ascending towards the Chomnaga Valley and the Chola Pass. It was in the Chomnaga Valley that Dr. Campbell and Sir Joseph Hooker were seized and pinioned, and placed in durance vile. I have already explained to you that the finest rhododendrons grow on the western part of Sikkim towards Nepaul; but second to those are the splendid blossoms of the Chomnaga Valley. It was there that Dr. Hooker collected the seeds of a great number of splendid species and varieties which are now adorning the public gardens of England; and it is therefore to that scientific journey, taken thirty-five years ago, that we in England owe some part of the pleasure and instruction we now derive in viewing the public gardens in this country. Chomnaga lies at the foot of the Chola Pass, from which latter are visible the various lakes to which our pictorial illustrations relate, and which I will now proceed to describe.



I.—PALACE OF THE RAJA OF SIKKIM AT TUMLONG.

Our first illustration represents the palace of Tumlong. This comparatively humble though picturesque dwelling belongs to the Rajah of Sikkim, and may be regarded as his Winter Palace. During the summer,

II.—CHOLA LAKE AND PASS. MOUNT KANCHANJANGA IN THE DISTANCE.

[*To face p.* 327.

particularly when the rains descend, he lives, by permission of the Grand Lama of Tibet, in the valley of Chumbi, because Chumbi, being upon the other side of the Chola range, the climate is not affected by the rainy season; but during the winter he lives at this little palace of Tumlong. Humble as the place may be, it is yet the capital of Sikkim. It is situated on a hill, about 5000 feet high, having in the background the north-western end of the Chola range. The hill indicated in the picture is that known under the name of Gnaream on the maps. The next picture represents the Chola Pass and Lake. This is one of the old passes by which people used to proceed from Sikkim towards Tibet; but it is much less used now than formerly, since the opening of the commercial route, already described, by the Jyelap Pass. Immediately behind the lake you will observe a rough, rugged, serrated range of hills rising up with its fantastical peaks, something like the jagged edge of a gigantic saw. Now, those are the hills which overlook the valley of Chomnaga—the upper valley where Dr. Hooker and his companions were seized by the Sikkim people. In the distance is Mount Kanchanjanga, viewed in its south-eastern aspect, or that which faces towards Chumbi and Tibet—the very opposite view from that which is ordinarily seen of Kanchanjanga by British visitors at Darjiling, which is really the western view facing towards India. This eastern view is that which is seldom seen by Anglo-Indians, and is, I venture to believe, the finer view of the two. There you see all its magnificent expanse of snows, the splendid granite formations, and all the glacial world of that snowy mass. The height of the Chola Pass and of the Lake may be placed at 15,000 feet above the sea, or very nearly the height of Mont Blanc, the height having been carefully ascertained, first by Sir Joseph Hooker, and afterwards by Mr. Blanford. The geological formation of the Chola range, for the most part, consists of gneiss. This, again, has been carefully ascertained by Mr. Blanford. Of course Kanchanjanga, in the distance is, for the most part, composed of granite—certainly all the upper part is so composed. The upper part of the Chola range is absolutely sterile; not a tree, not a shrub, grows in the locality—nothing but a few kinds of Alpine grasses and scanty herbage, which are dried up in most seasons of the year.

Our next picture represents the Chokham Lake. Whilst the Chola Lake lies exactly on the boundary between Sikkim and Chumbi, and therefore between the Indian and the Chinese empires, the Chokham Lake is situated a little above it and just within the Chinese or Tibetan border. I say "Chinese or Tibetan," for Tibet is virtually Chinese. The precise relations between the Grand Lama and the Emperor of China I need hardly at this moment undertake to explain, but virtually that part of Tibet is thoroughly dominated by China. Tibet has a local government of its own, no doubt, but its affairs are controlled by a Chinese resident supported by Chinese troops, and the Chinese are particularly careful to put boundary marks along the border. They do this in the most jeaolus and particular manner possible. Wherever I went, my footsteps were dogged by Chinese and Tibetan officials. Even if I stopped to take a sketch, these gentlemen were always considering whether my foot was upon one side of the border or the other. On one side of the wooden boundary-pillars was an inscription written in the Hindi character of British India, and on the other side an inscription in Chinese. When I went up to sketch the Chokham Lake, the Chinese local officers with their Tibetan attendants were very careful to warn me that I had transgressed the limits of my jurisdiction. However, we secured the sketch, and there it is, or at least the copy of it. It is decidedly the finest of all the lakes. I have been reminded by the high authority of our President that I ought not to call these sheets of water "lakes," and that they are more strictly "tarns," because they have no outlets. In some respects they present geological problems; however, you will allow me to use "tarn" or "lake" as interchangeable. If the Chokham Lake is a tarn, it attains to the proportions of a lake, and is the loftiest and largest of the series. I do not know its dimensions, but it comprises an area of several square miles. The colour of the water is most superb. The altitude is fully a thousand feet higher than that of the Chola Lake, and therefore cannot be less than 16,000 feet above the level of the sea. We ourselves soon began to find that we were approaching a great altitude, because we found as we climbed the rocks that we became very easily winded, and our heads began to ache. However, when we surmounted the rocks we were more than rewarded by the splendour of the spectacle. Emerald, azure,

III.—CHOKHAM LAKE ABOVE CHOLA PASS. MOUNT CHANGU KANG IN THE DISTANCE.

turquoise—all these phases combined can give you no impression of the indescribable beauty of the colour. In the background of our view will be seen a tract of low forest which creeps along the base of the hills overhanging the Chumbi Valley, and beyond the valley rise a series of purple, pinkish hills. I need not say that, to a spectator on the hills themselves, their colour would be of the dullest and most opaque yellow ochre; but the effect of distance in this clear atmosphere is to throw a sort of etherealised pink-purple over the mountains, which has a most lovely effect. Beyond the range of hills rises the snowy mountain of Changu Kang, a sort of pyramid. This Changu Kang is not found on the maps, but is very well known in that locality, and it separates Bhutan from Tibet.

On the southern spur of the Chola range lies the subject of our next picture, the Bhewsa Lake, which is much lower than those which I have been describing. It may be considered as having an altitude of 12,000 feet, being fully 4000 feet below the Chokham Lake. In the foreground near that lake, especially on the left-hand side of the picture, you will see indications of vegetation. These represent immense expanses of scrub rhododendron, a sort of rhododendron that grows very low and very thick, and spreads its branches in a tangled mass over the ground. It is a dreadfully difficult scrub for a pedestrian to get through; but it is very valuable to the traveller, because it supplies him with fuel for his fire, which he needs in the cold, and cannot otherwise get, and in the event of extreme danger in respect to water it will supply him even with moisture, because its leaves have upon them the hoar frost which can be wiped

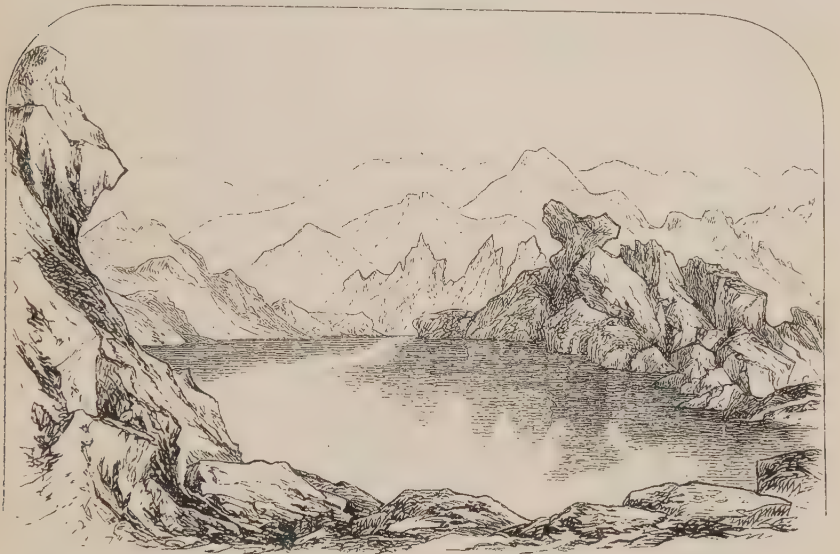
IV.—BHEWSA LAKE. MOUNT KANCHANJANGA IN THE DISTANCE.

off, and be made to supply a good deal of moisture to thirsty men, as I and my staff sometimes found out. This scrub is the only vegetation met with in this zone, lying above the limits of trees. The Bhewsa Lake has a purplish-violet colour. I am quite unable to explain the reason of this variety of colour in the lakes, but the Chola Lake was principally blue, the Chokham Lake a mixture of emerald, azure, and turquoise, and Bhewsa Lake somewhat violet and purple. Behind the Bhewsa Lake, in the middle background, rise the gneiss rocks overhanging the Chomnaga Valley. In our illustration of the Chola Lake these rocks are seen in shadow: here, in this illustration, they are in the full blaze of the setting sun, and beyond them Mount Kanchanjanga overhanging the lake is seen with the same evening effect. Instead of the glittering white in the blaze of the morning sun, it is now tinged with the pink and rosy hues of the setting sun.

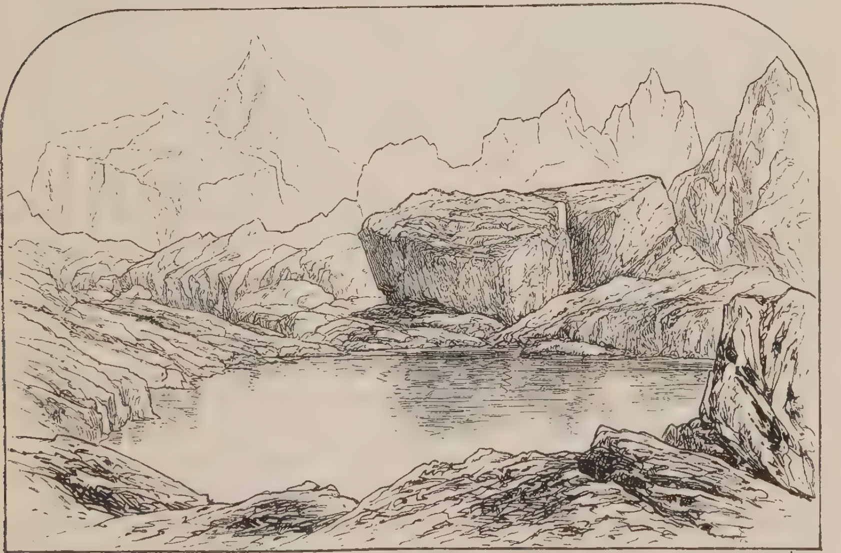
The bad weather we generally had was interspersed with lucid intervals of most glorious blue skies, and of course I selected those lucid intervals for making my sketches. Generally speaking, what really happens is this: early in the morning, at sunrise, the weather is quite superb; the sky is unclouded azure, and the mountains are unbroken white. This lasts for about three hours, that is to say, till about 10 o'clock in the day, and that is what we used to call the bloom of the morning. Then, and then only, can you take your sketches. The air is extremely cold—biting cold—and after sketching for a short time your fingers get perfectly numbed, and the only thing to do is to keep a supply of hot water close at hand, into which you can put your fingers, and so get a certain amount of warmth in them, which enables you to preserve their cunning for sketching. After 10 o'clock up come the clouds. You cannot tell how they form. A little bit of vapour, no bigger than a man's hand, expands; fresh men's hands arise and clouds accumulate, till at last the whole atmosphere is clouded over. This lasts till about middle day. Then the clouds seem to turn into snow, and a certain amount of snow falls in the afternoon, which makes you very miserable in the evening, and you sit down to dinner with snow all around you, and your little tent also encrusted with snow. But towards midnight the clouds pass away, and stars come out, and it is a magnificent night. Then you have the sunrise as already described.

Probably the sun when it rises will melt the thin snow during the bloom of the day. With that kind of weather you very seldom get a sunset view; but on that particular evening when I was at the Bhewsa Lake, the clouds somehow seemed to lift and to display the setting sun, literally bathing Kanchanjanga in roseate light; and that happy moment, of course, I seized to make my sketch.

The Bhewsa Lake being comparatively low, we had to ascend from there once more towards the crest of the range, towards the point you will find named on the map Yakla Pass. On that ascent we found three very little lakes, for which I will adopt our President's designation of tarns. The first of these is overhung by some very weird, strange-looking rocks, piled one over the other as it were by Titanic and Cyclopean hands; and in the back the view is not towards Tibet, but towards Darjiling. Leaving this tarn No. 1, we get to tarn No. 2. In



V.—TARN NO. 1 ON ASCENT TO YAKLA PASS. DARJILING HILLS IN THE DISTANCE.



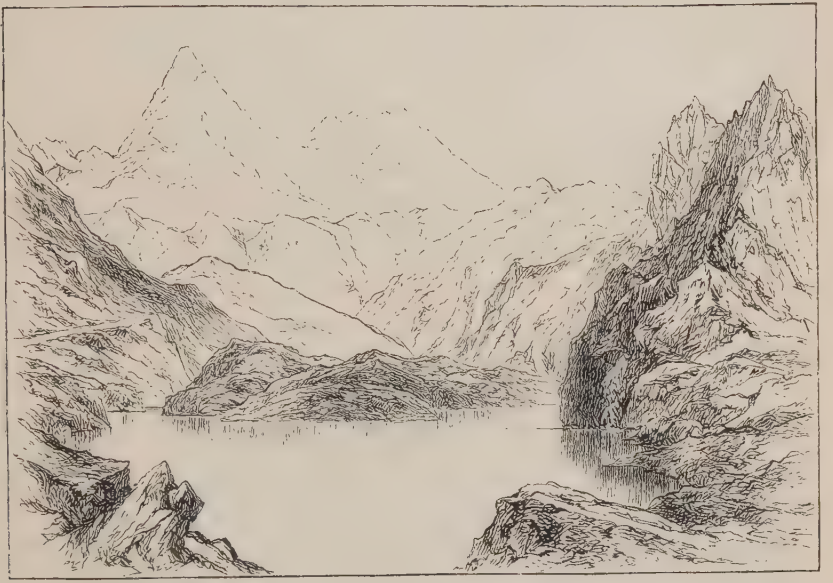
VI.—TARN NO. 2 ON ASCENT TO YAKLA PASS.

this latter you will observe a very pointed hill tipped with snow. This is the well-known peak, locally, of Dopenti, which geographers will find marked on Stanford's map as Dobendi, another name for the same hill. Dopenti Hill is the highest point of the Chola range, and is the same eminence as that called Chola Peak by Sir Joseph Hooker. It really overhangs the Chola Lake; but the lake is so close under the base that the summit is not visible from the banks of the lake. We have now advanced 10 miles to the eastward along the ridge, and thus we get a view of the Dopenti Peak which overhangs the Chola Lake and Pass.

We now come to tarn No. 3, which is exactly at the foot of the Yakla Pass. The Yakla Pass is just visible in the illustration, marked by a long saddle in the middle background. The existence of so many of these lakes or tarns—by whichever name they should be called—all at the crest of a lofty range of mountains, presents many geological problems which I will not now discuss; but I may mention in general terms that Mr. Blanford, the best geological authority who has yet visited the country in which they are situated, ascribes them to glacial action. He thinks that in a former geological period immense glaciers have scooped out these hollows in the crest of the mountains. Passing from the tarns, and ascending to the saddle, which I have pointed out as indicated on the illustration—a most toilsome ascent—a view is obtained of the Yakla Pass and Lake, and in the distance of Mount Chumalari, all which you will see depicted in our pictorial illustration. This, on the whole, was considered by all of us to be the most beautiful of all these lovely views. The lake and the mountains on either side of it, with other mountains in the middle distance, and this graceful obelisk of Chumalari, with the mountain shaped like a double-poled tent

VII.—TARN NO. 3 AT FOOT OF YAKLA PASS.

on the left of the obelisk—the whole of the features together make up a truly lovely view, most difficult to sketch, I admit, because of the extreme, biting cold and the wind in that exposed position. The colour of the lake is an intense blue. In the foreground, on the left-hand side, you will observe indications of a road. The mark of the road is slightly exaggerated in our drawing, in order to make it clear to you from a distance; but it is of course an extremely rough mountain pass. It is one of the passes by which the flocks and herds of Tibet descend to British India, as I myself saw. I never beheld such beautiful sheep and goats in my life as those which were coming along that pass at the time of my visit. A Landseer, if he were present, would have made of these splendid herds a worthy foreground to this dazzlingly beautiful scene. On the other side of the lake are again seen the hills of Chumbi. These hills comprise what is marked on the maps as the district of Phari. I mention that, because on all maps there is a district marked Phari; but the name applies only to a subdivision of the Chumbi Valley, and the hills of Phari are exactly indicated by the middle distance in this picture.



VIII.—YAKLA PASS AND LAKE. MOUNT CHUMALARI IN THE DISTANCE.

Once more I ask your attention to the peculiar beauty of the top of Chumalari. I have sketched it several times from several points, and on comparing the outlines I always found that they corresponded, so that I am very confident I have got the shape correctly. You will see that on the west side of the mountain there is a beautiful cone, gradually tapering into an obelisk, and on the eastern, or right, side of the mountain there rises a great square mass of snow, which we used to liken to the double-poled tent of the Indian marches.

We are now on the crest of the range, and the altitude of the Yakla Pass is nearly the same as that of the Chola Pass, namely, 15,000 feet. Our route then descends from the pass for several thousand feet, to reach the Nimyetso Lake. *Tso* is a common termination in Tibetan names, meaning water, and is sometimes pronounced *tcho;* in fact, Europeans cannot tell whether natives are saying *tso* or *tcho.* It merely means a lake. Nimyetso is Nimye Lake. And I ought to take this opportunity of mentioning that the termination *la* means a pass, so that Chola, or Cho-la, merely means lake-pass, and Yakla, or Yak-la, is nothing more than the pass of the Yak, the famous Tibetan cow, so well known to geographers and naturalists. These cows are remarkable for the size and beauty of their tails, which are a very important article of commerce. You have often heard of the long-haired fan being waved by attendants over the heads of emperors and sovereigns on State occasions. These long fans are nothing more than the tails of yaks, and the consequence is they bring thousands and thousands of pounds annually into the pockets of the Tibetans.

IX.—NIMYETSO LAKE.

After this slight digression, I must ask you once more to revert to the Nimyetso Lake, as depicted in the illustration. That lake is lower than any of the others which we have been considering. Consequently it is surrounded by forests; fir-woods on one side, and on the other a rich sylvan mass, composed chiefly of chestnut-trees. The lake itself will be admitted to be a true lake, for it has an outlet; situated near to the foreground of our picture. Behind the forests rises the Chola range of hills, from which we have been descending, tipped with snow. On that ridge, on the left-hand side of the picture, is the Yakla Pass and Lake, which I have just described; and further on the left, outside the picture, would be the Chola Pass; and out of the picture on the right of that ridge is the Jyelap Lake, to which I am about to introduce you. This Nimyetso Lake is 10,000 feet only above sea-level.

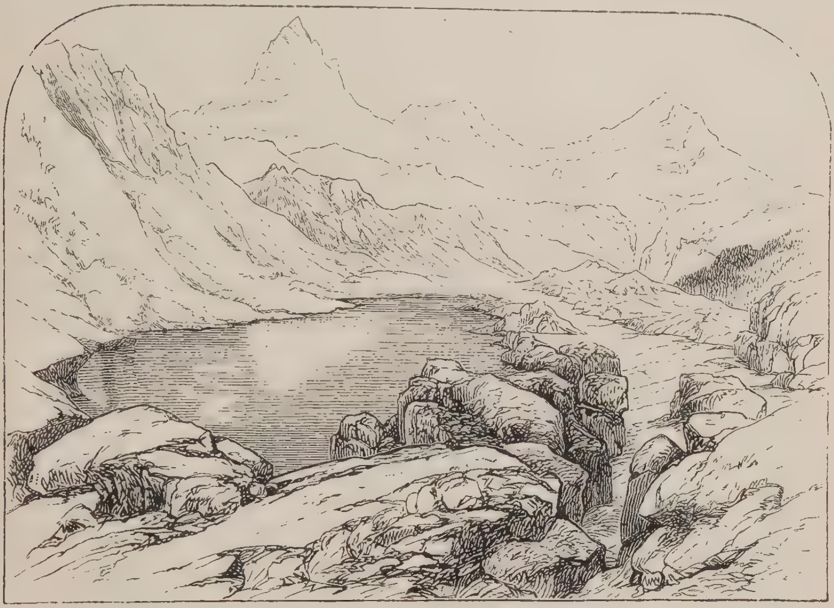
I have now to ask you to ascend to the top of the forest-clad hills in the middle distance of our picture, and then to turn off towards the right; you will then be in the immediate neighbourhood of the next scene, which is the Bidantso, what we used to call the Blackwater Lake, on account of its unaccountable blackness. This is depicted in the illustration. The lake was sketched in a snowstorm, and in the background is Mount Gipmochi. In Sir Joseph Hooker's 'Himalayan Journals' the name Gipmochi is always applied to the mountain which terminates the Chola range. This range you will have observed is the mountain region to which the chief part of my lecture this evening has related. At its north-west end rises the Gnaream Peak behind the Tumlong Palace, and Mount Gipmochi is at its south-eastern end. Our illustration of the Blackwater Lake, with Gipmochi in the distance, represents the view, as I have already observed, in a snowstorm. There had been during the afternoon just that sort of snowstorm which I have

X.—BIDANTSO LAKE AFTER A SNOWSTORM. MOUNT GIPMOCHI IN THE DISTANCE.

previously described; but towards evening some puffs of wind came, the mist and cloud lifted, and the snow ceased, and then we beheld a glorious spectacle, imperfectly represented, I am afraid, in the picture before you. The bright and radiant atmosphere of the world below you seemed in this view to be shining through the mists of these upper regions—mists which resembled a thin veil of transparent gauze. Anything more lovely than this sort of subdued light, dimly illuminating the lake and its snowy adjuncts, and the grand Gipmochi in the background, and the retreating and receding mists and clouds with the snowstorm still seeming to rest upon the extreme left of the picture, it is hard to conceive. The altitude of Blackwater Lake above the sea-level may be estimated at 12,000 feet, that is to say 2000 feet above the lake which we have last seen, and somewhat higher than the Bhewsa Lake. It also has in the foreground on the left-hand side some of the scrub rhododendrons which I have already described. The leaves of the bushes are represented in our view as encrusted with snow. It was near this Blackwater Lake that we were encamped, and we had to pitch the tents on the only lofty ground we could find, which was a half-frozen and indurated swamp, so that you may imagine the amount of sneezing and wheezing which troubled me and my followers upon that occasion. After a very snowy afternoon, which was just relieved by this gleam of light at sunset, we spent a rough night on this swamp; but towards midnight the sky cleared, the stars came out, and we were enabled during early dawn to commence the ascent to the Jyelap Pass. Thus I have conducted you by the picturesque route to a junction with the commercial and political route already described.

We ascended to the Jyelap Pass early in the morning, and once more came upon one of the glorious sunrises of this region, the landscape, as shown in the illustration, including not only Chumalari in the background, but also Changu Kang Peak, with the Jyelap Lake in the foreground. In the background of our view of the Chokham Lake, Changu Kang only was represented, and in the background of the Yakla Lake, Chumalari only; but here both are seen, forming upon the whole the finest background to be found in these parts of the mountains. This Jyelap Lake is a very little one; but behind it, in the middle distance, are once more visible the pink rosy-coloured hills, with Chumbi, combining the district of Chumbi proper and the district of Phari which I have already mentioned. Between this lake and the lower hills there intervenes the valley of Chumbi, one of the deep valleys, which I believe is not more than 3000 feet above the sea. So that in order to get to those rosy-coloured hills from the lake, it would be necessary to dip down many thousand feet and re-ascend many thousand feet, and it would probably take two days' march to get to those hills. I have already explained to you that the trade route comes from British territory and Darjiling to this Jyelap Pass under British auspices and management;

and at Jyelap Pass we have reached the extreme boundary of Sikkim, and therefore the boundary of the British empire. Beyond this commences Tibet, and we hope in future ages that the road from India to China will run over those rosy-coloured hills past the western foot of Chumalari. At the left, or western, base of Chumalari in our picture may be seen the points where the road from India to China is to cross the central line or backbone of the Himalayas. The country beyond has been beheld by very few European eyes, but the road passes on northwards towards Lhassa, and then joins on to the route which was followed by Bogle and Manning, and which has been so well described in the book by Mr. Clements Markham.



XI.—JYELAP PASS AND LAKE. MOUNTS CHUMALARI AND CHANGU KANG IN THE DISTANCE.

Now, gentlemen, I have reached the end of my geographical exposition, and also the end of my small picture gallery; and I hope that pictures and maps, and pointing and exposition together have given you a clear conception of the topographical features of the country which I have undertaken to describe this evening. It has been the aim of the Geographical Society to give the members present in this theatre night after night, occasion after occasion, precise geographical details of different parts of the world. Whenever we come to topographical details we undertake to give them absolutely, to describe to you the particular locality with the same particularity with which the country might be described between London and Richmond. That has been the aim, I believe, of myself and many other gentlemen who have stood in this place and addressed you in this theatre. Sometimes we illustrate localities in the North Polar regions, sometimes localities in the middle of South America, sometimes localities in South Africa, and sometimes, as you see, localities on the confines of the British empire in the East. On the last occasion I stood here, we endeavoured to give you precise information, such as you might require with regard to Southern Afghanistan, equal to that which you might obtain of the City of London by taking a bird's-eye view from the top of the Monument; and now I have endeavoured to give you similar information regarding the very opposite extremity of the British empire, namely, the confines of Sikkim and Tibet, and the line that is intermediate between two of the great empires of Asia. I trust that if you have at all followed me through all the travels and hardships of the march, you have also been rewarded in imagination by the splendid spectacles which you have seen: and I trust that when you go forth from this dimly lighted theatre into the streets outside, you will carry away with you bright visions in your inner minds; that you will have, as it were, Chumalari and Kanchanjanga "upon the brain." But I also hope that you will think with patriotic pride of the achievements of your countrymen in that quarter of the globe—achievements scientific, commercial, and political; and that you will have a kindly sympathy towards the labours of the many excellent men who have travelled in that region—historic men, as Turner, Bogle and Manning, also Dr. Campbell; and such living travellers as Sir Joseph Hooker, Mr. Blanford, and Mr. Edgar; and that you will carry away with you ideas of the peaceable progress of British influence and British power in that quarter of Asia.

On the conclusion of the lecture,

Mr. W. T. Blanford said Sir Richard Temple had treated his subject so fully that he could add very little indeed to the charming description which had been given. The history of his own journey in the Sikkim Himalaya was briefly this. In the year 1870 he had three months to spare, and he particularly wished to see a portion of the interior of the Himalaya. With Captain Elwes, who was then at Darjiling, he arranged an excursion to one or two places which had not been visited by Dr. Hooker, who, when on his way to examine the so-called Chola range, had been seized and imprisoned by the Sikkim Government. It had been pointed out that a rather tedious journey led to the Upper Tista Valley, but this had been made very much easier by a good road to Tumlong. From Tumlong, however, it was only practicable on foot, and even then it was necessary to climb over trunks of trees in order to get along. The district, too, was extremely hot and unhealthy, and infested, in the rainy season, with all sorts of insect plagues and enormous numbers of leeches, so that if this route could be avoided a great deal would be gained. Captain Elwes and himself had heard of the Jyelap Pass, and it appeared to them that there might be a road along the east side of the Chola range, which would avoid Chumbi, and enable them, by the Tankra Pass, to reach the Lachung

Valley, which had a comparatively temperate climate. They were, however, stopped by the Tibetans, and finally obliged to go by the road through Tumlong. Meantime, they had the good fortune to see the lakes Sir Richard had described, which, singularly enough, at that time had not been marked on any map. The map on which they had chiefly depended was that drawn from his own observations by Dr. Hooker, who had been seized by the Sikkim authorities before he could examine the portion of the country south of Chola. Although he (Mr. Blanford) saw the lakes under by no means such favourable circumstances as regards climate as those under which they had been seen by Sir Richard Temple, he was very much struck by their beauty. Nimyetso Lake especially was peculiarly lovely, independently of the mountains behind. It was only two miles long, lying in a deep glen, surrounded by fine forest, the sides of the other lakes being bare except for the rhododendron scrub. He walked round the Bidantso Lake, and it was certainly one of the most characteristic examples of a glacier lake that he had ever seen. It had been visited within the last two or three years by a Hungarian geologist, L. von Loczy, who entirely confirmed the glacier theory of its origin, and as he had recently come from the Alps, his opinion was no doubt trustworthy. The lower end of the Bidantso was dammed by large blocks of stone piled together in a peculiar way, which would be easily recognised by all who had examined glaciers, as the manner in which stones were left at the end of a glacier. A glacier gradually crept downwards, carrying with it many stones and large masses of rock which were left where the glacier melted. At the head of the Bidantso there was a second barrier of loose blocks of rock, and behind that an old lake bed which had in the course of ages gradually been filled up. Many other lakes were palpably rock basins, and as precisely similar lakes were found in ground formerly traversed by glaciers, it was fair to assume that the first named were formed in the same way. There was a lake, which probably had not been visited by Sir Richard Temple, near the bottom of the Jyelap-la, which was a fine specimen of a glacier lake. The accessibility of Sikkim was constantly improving. At the present time the railway was open to Silligori, at the base of the hills, and a steam tramway was now being made to Darjiling. This had already been opened half-way, and was expected to be completed in a few months. He believed, from inquiries on the spot, that a road through Chumbi would be comparatively easy to the temperate regions, where there was some of the very finest scenery he had ever seen. Some parts of the interior of Sikkim had never yet been explored. When Sir Joseph Hooker penetrated the country he was met with all sorts of difficulties, and was constantly half-starved. It was, however, now merely a matter of time and climbing.

The President said he was sure the Meeting would be all the more grateful to Sir Richard Temple, because this was the second time that day that he had addressed an audience, the first being at the University of Cambridge. All would agree that it was a great advantage to those who lived at home in England, when the Lieutenant-Governors of Bengal were of an inquisitive turn of mind, and liked to pry into the remotest corners of their government. It was an additional advantage when the Lieutenant-Governor was also an artist, and had a brother an artist, and possessed the faculty and the eloquence which could bring the beauties of nature vividly before the minds of others. The perfection with which all the preparations had been made had contributed to the completeness of the address. He was therefore sure they would all agree in a hearty vote of thanks to Sir Richard Temple, and in the hope that they might frequently hear him upon other subjects with which his varied experience had made him acquainted.

Sir Richard Temple, in acknowledging the vote of thanks, expressed the satisfaction with which he had listened to Mr. Blanford's remarks, which seemed to confirm many of his own opinions. When that gentleman visited the lakes it was the rainy season, whereas he (Sir Richard Temple) made his journey in the month of October,—the finest period of the year. That might account for the region appearing even more beautiful to him than it did to Mr. Blanford.

Dr. Regel's Expedition from Kuldja to Turfan in 1879–80.

By E. Delmar Morgan.[*]

In the 'Proceedings' of last year,[†] a brief reference was made to Dr. Regel's expedition to Turfan in 1879–80: I am enabled now to present to the Society the following further details of his journey.

Dr. Regel is the eldest son of the eminent botanist and director of the Botanical Gardens of St. Petersburg. He had travelled much in Turkistan, especially in the Kuldja region, where for some years he had held the post of district physician. His previous travels have been noticed in the R. G. S. 'Proceedings,' and his botanical discoveries have appeared in full in German scientific publications. This was his first expedition beyond the Russian border. His special qualifications for the task were a knowledge of botany and an acquaintance with native languages acquired by intercourse with the people, by whom he was universally liked. A strong constitution and an indifference to hardships or privations contributed to the success of his undertaking. It is probable, although we are not told so, that besides scientific objects, Dr. Regel was entrusted with a political mission, for at that time a collision with China appeared imminent, and exact information on the movements and strength of the Chinese forces was of course important for the authorities in Turkistan. His intention apparently had been to follow the Imperial Chinese highway to Urumtsi and Turfan, and from the latter place to turn southward to Lake Lob, that goal of Central Asian explorers, returning by the southern road viâ Kashgar to Kuldja. But the suspicions of the Chinese having been aroused, he was obliged to renounce the latter part of his plan. He is the first European in modern times who has visited Turfan; as its Mongol name signifying "residence" implies, this town has been a place of importance for many centuries. It was the chief city of the Uighurs after they removed hither from North-east Mongolia in about the ninth century, and the earliest records indicate it as a rallying point and centre for oppressed nationalities and creeds in the heart of Asia. Situated between China and Dzungaria, it preserved its neutrality, and escaped the fate which overtook its more powerful neighbours. Not only was it the resort of Mahommedans, but the votaries of all religions worshipped within its walls. Among the earlier travellers Marco Polo cannot be included as having visited Turfan, his route having taken him further south. Shah Rekh's embassy passed through it on their way to China in 1420, and found there a fine temple dedicated to Sakhya Muni. They experienced great cold on the way thither, and found, to their surprise, ice two inches thick, although travelling in summer. Nearly two centuries later, in 1605, the Jesuit father, Benedict Goez, was at Turfan, and remained there a month; his narrative, however, is almost wholly taken up with personal incidents and his religious polemics with the Mahommedan prince. But if Western writers are sparing in their notices of Turfan, Chinese literature contains ample materials for its history. It is mentioned under various names, that of Kara-hodjo (hotun) being among them. The region is described as rich in minerals, with a fertile soil and vast herds of horses pasturing on the hills. The prince had his summer residence on the northern side of the mountains at Urumtsi, of the present condition of which some interesting particulars are given by our traveller. A notion prevailed in Western Europe that the region of Turfan was highly volcanic. Ritter, relying mainly on the authority of Humboldt, speaks of the active volcanoes of Peh-shan, north of Ku-cha, and Ho-chau near Turfan, the one sending forth streams of lava, fire, and smoke, the other burning like a beacon. He also describes the remarkable solfatara of Urumtsi, and the sal-ammoniac and asbestos collected by its inhabitants. In the following narrative no allusion is made to anything of the kind. Dr. Regel indeed speaks of the intense heat of Turfan obliging its inhabitants to live underground in chambers excavated by the side of their aqueducts, and it is probable that its hot, rainless climate or the reddish colour of the rocks originated its name of Ho-chau or "fire-city," applied to the district as well. Of active volcanic phenomena nothing is seen in Central Asia at the present day, and we are left to infer either that Humboldt was misled by Chinese traditions or that he theorised from his experiences in the Cordillera of the Andes. The whole subject may perhaps be thoroughly investigated at some future day, for space will not allow me to extend these prefatory remarks.

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[*] Dr. Regel's account of his journey is translated from the 'Proceedings' of the Imperial Geographical Society, vol. xvi. No. 2. The foot-notes to the present paper are by E. D. Morgan.

[†] Vol. ii. p. 489.

Dr. Regel left Kuldja on the 4th of May, 1879, with a party of four soldiers, one Manchu, two Kara-Kirghiz, and a Kazak-Kirghiz. Sixteen horses and four camels composed their caravan. Starting in a north-east direction up the Pelliuchi rivulet, they crossed a pass 7000 feet high in the direction of the Borborogussun river, near the sources of the Djirgalan, and moved north along the Pelliuchi.*

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* The route of Dr. Regel was really this. He followed the Pelliuchi upwards in a north-east direction. Having crossed the watershed of the Borohoro or Iren-Habirgan Range, in order to descend to the Chinese imperial highway at Djin-ho, he must have

Leaving the picturesque and deeply indented valley of the Borborogussun, it was necessary to cross plains and hillocks of sand before arriving at Djin-ho. Antelope and pheasants abounded here. But the heat was oppressive (145° Fahr. on the sand), and with camels it was impossible to travel fast or make long marches. At Djin-ho Dr. Regel's Chinese acquaintances provided him with the necessary documents to enable him to proceed to Shi-ho, although merchants were turned back.

Beyond Djin-ho the country is barren desert with dry, salt-encrusted lake-beds, affording the party an opportunity of replenishing their supply of this indispensable article. After pursuing their journey about 40 miles they came to the Chinese outpost of Tatu, situated in a poplar wood (*Populus euphratica*), the only tree attaining any size in these dry, salt deserts. The garrison, numbering about 60 men, came out to meet Dr. Regel, and after some interrogations allowed him and his party to proceed without hindrance. Their next halting-place was the outpost of Kum-tam, on the Tallik, an almost dry river-bed, and at a distance of 40 miles from Tatu they reached Sigoshur. Here, notwithstanding his credentials from Djin-ho, Dr. Regel was very discourteously received, and was informed that no Russians were admitted. The travellers encamped in a wood of elms near Sigoshur, having been almost compelled to use force in order to regain possession of their horses which had been taken from them by the Chinese. Three days were passed in vain expectation of the coveted permission to proceed. At length Dr. Regel started without leave for Fintadja, a small village on the border of the wood, seven miles from Sigoshur. Here he left his escort and rode forward, accompanied by only one of his native servants and two soldiers, across a well-cultivated though unfruitful plain to Shi-ho, 23 miles further. But, although Dr. Regel found General Shilaussun at this place, the kindness and attentions he had previously shown to this officer and his suite when they visited Kuldja, were ill requited, and no final answer could be obtained. Efforts were made to dissuade Dr. Regel from his intention, and much was said of the dangers of a journey to Turfan, but to these he paid no attention, and on the third day after his arrival he at length received an answer communicated officially that not a single Russian could be admitted into the Celestial Empire until Kuldja were restored to China.

Nevertheless Dr. Regel was permitted to return through Chinese territory to the river Kash, and thence to Kuldja. But the Chinese are

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followed the valley of some river flowing north. The Borborogussun is mentioned, and a river of this name, with the qualification "Southern," appears on the Russian map of Turkistan (40 versts to the inch), emptying into the Ili. It may be that another river of the same name, and in about the same meridian, starts from the opposite slope of the mountains and flows towards the Borotala, possibly the one alluded to. The valleys in the Borohoro Mountains are generally prettily wooded, apricot trees (*urink*) being especially abundant.

ignorant of the geography of their country, and only maintain posts along the caravan roads. This circumstance induced our traveller to believe that he might circumvent them and reach his goal by another way.

On the 24th of May, Dr. Regel, escorted by two officials and servants, left Shi-ho, and arrived at Sigoshur, ostensibly to prepare for his return to Kuldja, and indeed he went as far as Kum-tam, but at the first poplars he turned off the road and marched southwards up the course of the Tallik through a stony plain. There the party were safe from pursuit for a while. To this plain at nightfall herds of kulans or wild asses descend from the mountains. The travellers encamped for the night at some distance from the Borohoro Mountains, but took the precaution of not lighting fires, for fear of betraying their whereabouts to the Chinese.

The following morning they arrived at the ravine whence the Tallik issues as a foaming torrent, and rode along a mountain track, having every now and then to stop and make it practicable for their baggage animals. Several neglected mines, formerly yielding gold and silver, as it was reported, were passed.

On the 27th May, at an altitude of 4000 feet, they began a steep ascent, at first in a south-west direction, and afterwards west. Here some choice plants, including entirely new species, were added to the herbarium. At 7000 feet they fell in with a pathway leading west through cliffs devoid of arborescent vegetation. Here, 27 miles from their night camp, they looked down upon the upper course of the Tallik, whilst on the south a stupendous icy chain extended towards Lesser Yulduz.*

"At our feet," writes Dr. Regel, "a magnificent panorama unrolled itself. Unfortunately we could not tarry, for our supply of water had run short. In order to discover a pass across the Iren-Habirgan Range [Borohoro], I crossed the border marked with firs; but our attempt was unsuccessful, and a hailstorm compelled us to retire. A second effort proved equally unsuccessful; the glaciers were thickly covered with snow, and afforded no foothold for horses and camels. Much further south the glacier rose to a height of at least 16,000 feet."

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* The Tallik is not marked on the Russian map. Supposing it to be in the same meridian as Kum-tam, i.e. in about 82° E. of Greenwich, the great chain on the south would be the main axis of the Borohoro Range, attaining, as Dr. Regel estimates, the very considerable elevation of 16,000 feet above sea-level. When this region is more known, a correct idea may be formed of its extent, the grandeur of its scenery, its great snow-clad ranges of mountains, its deep and rapid rivers, its rich pasturage, its glaciers and waterfalls, its springs, its luxuriant vegetation, its wooded valleys, where year after year millions of apricots and apples ripen only to litter the ground or to be devoured by wild beasts, its mineral wealth, its inexhaustible coal-fields, its capacities for agriculture —natural advantages at present neglected, for the country is almost uninhabited, except in the immediate vicinity of Kuldja and the few Taranchi villages up the Ili and the Kash. The valley of the Kungès is deserted along the whole course of this river from its confluence with the Tekès; no human habitations disturb its solitudes, no herds of cattle feed on its rich pasture grounds. A mournful silence broods over everything, and wild nature reasserts her sway. Such is the fate of countries and races subject to China. The Kalmuks, a Mongol race who long ago submitted to her, and to this day wear the plait of hair in token of their allegiance, are becoming extinct. The Kirghiz, on the other hand, advancing from the west under the protection of Russia, are everywhere occupying the camping grounds of their ancient foes and rivals. Is not this a significant fact, not to be lost sight of in a forecast of the future?

On the 5th June, after a halt of a few days to collect plants and insects, the expedition resumed its journey towards the south along a river flowing out of the Iren-Habirgan. Here vegetation was scanty, only a few trees growing along the crests of the hills over which the frontier line was carried. The scenery, however, was wild and impressive. On either side rose cliffs several thousand feet high, crowned with pinnacles and great *aiguilles* of ice, and waterfalls descended in sheets of spray. Every time Dr. Regel attempted crossing the glaciers, clouds collected, and snow and sleet drove him back, rendering it extremely difficult to find a road. Indeed, there are no roads in this wild, majestic, mountain country. The only means of advancing is by shaping a course across ravines, and fording, as best one can, the mountain streams. The Chinese hunter accompanying the party was all but drowned, as in the excitement of the chase he attempted to cross the Tallik in pursuit of a wounded stag, coveting its horns, not for Dr. Regel's collection, but in order to obtain from them the life-elixir so highly prized by his countrymen in China—a divergence of interests which prompted him to ask for leave to return home.*

From this point of their journey the travellers continually ascended for about seven miles to the valley of the Kum-bel or Kum-daban (also called by Mongols Tortu-gol or Epteh), and having crossed the watershed at an approximate height of 9000 feet, descended without difficulty to the belt of pine forests. Here they found an abandoned Torgute shrine, surrounded by graves and cells. In one of these, evidently used for sacrificial purposes, lay a number of MSS. of the time of Batu-wang,† and clay idols, of which Dr. Regel made an interesting collection. Unhappily, his guides had become so mutinous that he never slept without a revolver in his belt, for in Central Asia, as indeed everywhere, quarrels and dissensions among the hired people, their rival jealousies and intrigues against one another and their leader, are among the inevitable incidents of travel, and the source of embarrassment and annoyance to the traveller, often occurring at the most inconvenient time, when hardships and privations of all kinds have to be borne.

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* A large trade in deer horns is carried on with China; those most highly prized are the young ones with the velvet still upon them, and these fetch a high price. The Borohoro Range is celebrated as the haunt of the maral or large deer (*Cervus elaphus*), hunted for this purpose.

† Batu, surnamed Sain Khan, the good prince, son of Juchi and grandson of Jinghiz, is presumably the personage referred to. His life and invasion of Hungary in A.D. 1240 are told in Part II. of Howorth's 'History of the Mongols,' pp. 36–102.

From the valley of Kum-bel Dr. Regel and his party crossed the Ulan-daban Pass at a height of 10,000 feet, leading to the district of Djin. These mountains run in several parallel chains due east and west, terminating towards Djin-ho, in the bare hills already mentioned. Two Taranchis previously sent back to Djin-ho by Dr. Regel now rejoined the party, reporting that couriers had been sent from Shi-ho to try and discover the whereabouts of the Russians, but had of course been unsuccessful, never having left the caravan road.

On the 16th June they descended to the lower tree belt; and here, hidden by sandstone cliffs, they came upon a lovely lake, called by Mongols Koko-nor, or the "Green Lake," and held in great veneration, the Wangs or Khans of the Khoshotes visiting it to pray and offer up sacrifices.

Continuing in a southerly direction, across a wooded slaty ridge, they arrived at another lateral defile of the Djin, called Bainamum. Hence they could see the whole course of this river, intersecting the plain from east to west, and bounded by mountains on the south. After climbing some more steep spurs, particularly arduous for the camels, the travellers arrived at the end of their day's march, on the bank of the wild, broad stream of the Djin. Here they encamped for the night, and the following day crossed the river by a bridge which they had first to repair. Yet more difficult was the crossing, on the 19th June, of a second branch of the Djin, the Tsagan-ussu, or "White Water," called lower down its course the Tsagan-tungeh. Ascending by zigzags, they surmounted the steep granite wall on the opposite side of the ravine, having occasionally to lift the camels over huge blocks of rock obstructing the path. The descent lay over hillocky ground covered with argillaceous soil, partly cultivated by Torgutes. After crossing this, they again came to the Tsagan-ussu nearer its confluence with the Djin, and here, at a tarn, or small lake, in the mountains, they shot two kulans, and added them to their collection.*

On the 23rd June they moved towards the river Nilki. In a valley extending towards the east they came upon the encampment of a wealthy Torgute prince, the owner of 60 yurtas. Some few of these were gaily decorated, and badges were worn indicating official rank, the prince himself being attired in a velvet robe. The Torgutes show the utmost indifference to the advance of China, and pay little heed to her efforts to restore her influence over them. The Chinese resort to artifice to accomplish their ends, as for instance by sending "gigens," or living Buddhas, to work upon the religious feeling of their former subjects.

On the 25th June, the party moved to the Djunkur-daban Pass, on the west, formed by the river Ulastai, a tributary of the Borborogussun.

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* Two specimens of the kulan shot by Prejevalsky in Mongolia are preserved at the museum of the Academy of Sciences in St. Petersburg.

On this pass, at an elevation of 10,000 feet, a rich Alpine flora was found by them. Beyond it they came upon an encampment of Chamars, as predatory in their habits as their kinsmen on the other side of Kuldja are peaceable and industrious.

On the 28th June they reached the river Nilki, a tributary of the Kash, and on the 1st July arrived at the first encampment on this river, and soon afterwards at the village of Nilki itself. Here Dr. Regel exchanged his camels for horses, the latter being far more useful in the mountains, and encamped his men while he started on a few days' visit to Kuldja to obtain all necessary supplies for prosecuting his journey.

Starting again from Kuldja on the 10th July, Dr. Regel returned to the Kash. As far as Mazar the district is highly cultivated by Taranchis, whose elder escorted the traveller to Nilki, and assisted him in procuring supplies of flour, horses, and sheep. This elder has another house, inhabited by his principal wife, at Ulastai, 20 miles beyond Nilki, up the Kash valley. It is the custom among Taranchis, Kirghiz, and Mongols for the men to purchase their wives, paying either in cattle or money, the women contributing yurta and clothes as their portion. In Taranchi houses the wives generally live together under one roof, each one, however, occupying separate apartments; but the wealthier Kirghiz give to each wife her separate yurta [felt tent], and supply her with money and cattle. With Mongols, on the other hand, wedlock is inexpensive. For instance, last year one of the Arbun-sumun tribe, having earned his first five rubles, stole a wife, and with his money bought a share in a horse and field sown with wheat, and for a house the newly married couple built themselves one of clay. The Arbun-sumun tribe, in the days of its prosperity, during the empire of the Dzungars, occupied Kashgaria and Turkistan as far west as Chimkend; now a valley on the Upper Kash is their last resort. Not far from the entrance to the defile of the Bargati are three sulphur springs, hitherto frequented only by natives, with a temperature of 105° Fahr.* A good road might without any particular difficulty be made to them from Kuldja.

On the 18th July the travellers reached the furthermost Kalmuk encampments in this direction on the Horgol rivulet. Somewhat higher,

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* The temperature, as taken by Colonel Matvéief and myself [E. D. Morgan] on the 16th July, 1880, was 122° Fahr. We both bathed, and Colonel Matvéief, who had been suffering from rheumatism in the shoulder brought on by fracture of the collar-bone, derived benefit from them. I can confirm, from personal observation, Dr. Regel's remark as to the facility for making a road to the upper valley of the Bargati from Kuldja. With the exception of one or two difficult places, and the last mile or two, where the path lies along ledges of rock overhanging the stream, no difficulties would have to be surmounted. When General Kaufmann visited the positions of the troops last summer, he drove in his carriage to Djirgantai, about 20 miles from the confluence of the Bargati with the Kash, and when I passed up in the same direction afterwards, the ambulance arbas of the cavalry division were stationed at this spot.

6000 to 7000 feet above sea-level, there opens out a rich valley with luxuriant vegetation, tall enough to cover not only a pedestrian but a man on horseback. But myriads of drone-bees and venomous flies produced great discomfort, the bites of the latter causing considerable swellings. Bridges too had to be thrown across the torrents which feed the Kash. To add to their difficulties the rainy season had begun, and while it lasted, Dr. Regel and his companions were continually in damp clothes, having often to clear for themselves a path through the dense forests. In this way they reached, on the 5th August, the confluence of the Kash with the Arislin, and here they found a Kalmuk who volunteered to guide them to the sources of the Kash. Proceeding up a tolerably easy road along this river, Dr. Regel noticed several heaps of stones with remains of Mongol sacrificial offerings. Mongols to this day are wont to pile up these heaps (*obo*) on the summits of passes, and every wayfarer flings something on them, uttering a prayer at the same time.*

About 27 miles above the confluence of the Arislin, the Moutchgéto falls noisily into the Kash. As none of his people would attempt to cross it, Dr. Regel himself, with one Kashgari, forded it on horseback and soon found a spot suitable for bridging. From this place, accompanied only by the guide, he ascended to the Moutchgéto Pass. This river flows from the north from glaciers which fill the whole of its upper valley, their extent and unusual heavy snowfalls rendering the pass impracticable, at all events for that year.

From the summit of one of the peaks Dr. Regel obtained a view of a *mer de glace* stretching from east to west. From this point in about E. long. 85° and N. lat. 43° 30′, the party had to turn back in order to discover the pass of Aristan-daban, which lies in a southerly direction up the valley of a river of that name, across the Arshan hills, and leads to the valley of the Upper Kungès and to the Lesser Yulduz. But before leaving the elevated region in which they were then, Dr. Regel wished to discover the sources of the Kash in some lofty mountains, and accordingly directed his march thither. At a height of 10,000 feet he found a warm spring of perfectly sweet water. Near it he shot a rare species of bear, of small size, with white throat and upturned snout. At last he arrived at a flat, elevated region, surrounded by waterfalls. Here was the glacier which gives birth to the Kash and at the same time guards the approach to a giant mountain 15,000 feet high. Here too, at an elevation of 11,000 to 12,000 feet above sea-level, an abundant Alpine flora clothed the slopes of the mountains. But Dr. Regel's enjoyment of this scene was brief, for speedily a cold rain began to fall, and this turning to snow soon covered the ground with a layer three inches in depth. It was not without considerable difficulty that they succeeded in crossing the swollen torrents as they made their way to the confluence of the Aristan with the Kash. Following it to its source, their progress was again stopped by large glaciers, an unusual occurrence, for in ordinary years ice does not generally lie here. This would have necessitated their turning back, had not Dr. Regel accidentally discovered, on the 5th August, a pass which the guide had apparently not wished to show, it being often used as a means of escape by robbers. This pass is only 10,000 feet high, and its slope towards the Kungès is even much richer in vegetation than on the Kash.

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* Another custom I have noticed near Mongol encampments has been a light rope stretched across the path, supported on two poles or sticks stuck into the ground; suspended on the rope are a row of sheeps' blade-bones, covered with texts or prayers written by the lamas. In passing under these singular archways, which usually mark the entrance and egress of the Kalmuk encampments, the rider checks his horse, takes a blade-bone from the line, reads or appears to read the inscription, returns it to its place on the rope, and plucks a few hairs from his horse's mane, tying these in a knot by the side of the blade-bone.

Hence, by a comparatively easy road, they turned towards the east. On the 11th August, while crossing the Odon-kur Pass leading into the Kungès valley, the travellers were overtaken by a violent snowstorm. Snow fell to the depth of two feet, and two of their horses perished. At length, on the 14th August, they crossed a pass into the Lesser Yulduz, halting on the 15th at the confluence of the Shanchagai [? Tsabtsagai] and Sagustai at a height of 9300 feet. Both men and horses were by this time exhausted with their efforts, and Dr. Regel decided on sending six of his men, all his collections, and nineteen horses back to Kuldja, whilst he himself with six of his best men started for Turfan in an easterly direction. Meanwhile the snow thawed and the horses could find pasturage. After marching 40 miles the travellers entered a narrow swampy valley, leading to the elevated plateau of Algoi and Chalgoi, at a height of 9000 to 10,000 feet, absolutely bare of tree and shrub, and so destitute of fuel that the party found it necessary to break up their boxes in order to kindle a fire and make tea; as to cooking meat, it was entirely out of the question. The thermometer stood at night at 52° Fahr. On the 20th August Dr. Regel and his party gained the first Torgute encampments, and the first signs of settled life they had seen for two months. Here they were received most hospitably and pressed to remain, but suspecting that the ulterior design was to entice them nearer to the Chinese, Dr. Regel, for the sake of appearances, accepted their invitation to visit their chief religious encampment, but instead of proceeding thither he resumed his journey early on the morning of the 22nd August, arriving, after a day's march of about 40 miles, at the eastern channels of the Shanchagai, opposite the Chinese town of Sén-tsien.

The following day the party crossed a pass to Algoi, where, at a height of 10,000 feet, they came upon a lovely Alpine lake. Only a few feet higher glaciers are visible, across which lies one road to Urumtsi. Proceeding in an easterly direction along the valley of Algoi, margined on the south by a chain of lofty snowy mountains, at about 110 miles from the Torgute encampment mentioned above, they arrived at the mouth of the Chamgai, where an ancient Dzungarian fortress stands, and at length, on the 22nd September, entered the Taranchi stronghold of Turfan.

This former capital of the empire of the Uighurs maintained its independence till the conquest of Kuldja by the Chinese. Its Taranchi inhabitants received Dr. Regel and his companions cordially; not so the Chinese, however, who demanded their passports and were greatly alarmed at their arrival. They subsequently learned that fifty soldiers were sent from Kara-shahr in pursuit of them, in order to induce Dr. Regel to turn back; they, however, did not succeed in overtaking him. He was taken before the Chinese commandant, by whose order the travellers were well lodged and supplied with provisions. All their movements, however, were subjected to strict espionage until Dr. Regel's liberality weakened this.

The city of Turfan stands on a barren plain, and is supplied with water by subterranean aqueducts. So great is the heat that the inhabitants seek shelter from it in subterranean passages excavated alongside the aqueducts, and without artificial irrigation agriculture is impossible; by means of it, however, good crops are raised. There are two fortresses bearing the name of Turfan; the Taranchi one built by Yakub-beg (late Amir of Kashgar) and the Chinese one about a mile to the east of it, the population numbering altogether scarcely over three thousand. East of the Chinese fortress again are the ruins of old Turfan. Here a handsome minaret and numerous mortuary chapels are still preserved.

Dr. Regel lost no time in applying for the necessary documents to enable him to return by way of Lob-nor and Kashgar to Kuldja. The Chinese, however, detained him for five weeks, beguiling him with promises alone and taking his horses from him. At last, on the 1st November, they made it known to him that documents enabling him to return direct to Shi-ho would be shortly prepared for his use, and at the same time they returned his horses much reduced in flesh by insufficient food. Before taking his departure from Turfan Dr. Regel made some excursions in its neighbourhood with the permission of the Chinese. He appears to have been much struck with the brilliant effects of colour at Turfan, heightened as these are by a singularly clear blue atmosphere, so that walls and flat roofs even of clay houses glow with the richest tints.

The Imam of the Taranchis arranged an entertainment in honour of the traveller, during which women and girls danced to the music of guitars and tambourines, moving their arms up and down in a monotonous way. On his return, the Chinese pressed Dr. Regel to take his departure. But before leaving he was desirous of visiting ancient Turfan, having heard of its ruins, for the modern town, only 150 years old, affords no key to its past greatness. Accompanied only by a Kirghiz guide, and eluding the vigilance of his guards, Dr. Regel started for the oasis of Kara-hodja, standing in the midst of an unfruitful stony desert. Its houses are of a somewhat pretentious character. In most of them are looms and oil-presses, and the principal apartment is approached by a separate staircase. A mosque four hundred years old is remarkable for splendid mosaics in the Samarkand style, and good paintings. From this place Dr. Regel went 10 miles further to Mazar, a spot held by pilgrims to be superior in sanctity even to Mecca itself. Its houses and galleries are apparently fastened to the bare rock. Here too is a crypt built in the Samarkand style. After the usual ablutions incumbent on every traveller, the Imam, a descendant of the Hojas, who ruled in Kashgar during the last century, showed Dr. Regel all the curiosities, including banners with Sart and Dungan inscriptions, evincing altogether as friendly a disposition towards Europeans as hostility to the Chinese. On his way back to Turfan Dr. Regel explored the extensive ruins which, in his opinion, mark the site of ancient Turfan destroyed 400 years back. Judging from the extent of these ruins the city must have been a very large one. The old walls, of immense thickness, with bastions, gateways, and subterranean galleries, may to this day be traced. Among the ruins he found broken bits of Chinese pottery, and Buddhist idols showing grandeur of design, although made of nothing better than clay and straw.

On arrival at Turfan, Dr. Regel found the Chinese commandant in a state of great perturbation, as he considered the whole expedition to the shrine most dangerous. The guards who allowed him to depart were sentenced to be hanged, and were already undergoing that barbarous Chinese punishment of being suspended by the neck in cages, and their execution, had not Dr. Regel returned, would certainly have taken place. In spite of orders to leave immediately, he tarried one more day, and obtained the release of the incarcerated victims of the commandant's wrath; and the next day, 9th November, they followed the Russians into Russian territory, to escape that fate which it seemed would still have been in store for them after Dr. Regel's departure.

On the return march, the travellers visited the town of Toksun, consisting of a small fortress built by Yakub-beg and a bazaar, mostly frequented by Dungans. The cultivation of cotton and industry are better developed here than at Turfan. Below Toksun a large salt lake, extending many miles to the east, receives the drainage of the country.

In a violent storm of wind and piercing cold the travellers, on the 12th November, crossed the Daban-shan Pass, only 4000 feet above sea-level, halting at its foot at the little town of this name. North of it rises the triple-headed Bogdo-ola mountain, rearing majestically to a height of 14,000 feet. The Dungan inhabitants of the Daban-shan valley welcomed the Russians warmly. Neither windows nor doors of their houses are ever closed, and the windows are rarely even papered over.

On the 14th November they continued their journey in a westerly direction, halting for the night at Lake Aidin-kul ("Horses' Lake"). On its shore are two stones of an early heathen epoch, carved with human faces, and before these the Dungans say their prayers. On the 15th November they arrived at Urumtsi, situate outside the mountains, north of the south-eastern spurs of the Iren-Habirgan [Borohoro] Range. The view of this town, with its Chinese towers and gates, is magnificent from a distance; but inside, between the first and second walls, are nothing but ruins. By the side of it stands a fortress, built by Yakub-beg. The population of the town has been estimated at 30,000, but this is probably twice the actual number of inhabitants. The bazaar-street reaches for upwards of a mile, with some well-built shops, at which the best Chinese wares may be purchased. Even rare porcelain vases and painted glass may here be found. Russian merchandise, on the other hand, such as candles, cloth, &c., is as scarce as it is at Turfan.

Although warned beforehand of their intended visit, the governor of Urumtsi forbad Dr. Regel and his companions from going beyond the precincts of the police buildings, in which a criminal was suspended by the neck in a cage, but in such a way that his feet touched the floor. It was a most troublesome business to obtain an official document for a lodging, or even the necessary provisions. The courtyard of the house they occupied was easy of access to all; not a door would close, and the position of the Russians become almost unendurable when a mob of several thousand forced their way in to have a sight of them, inspect their things, and touch them. Against such a crowd, composed for the most part of thieves and murderers, the guard assigned for their protection by the authorities was inadequate. Many of these deported criminals are liable to be taken for military service in case of war, although, as Dr. Regel observed at Turfan, their conduct is outrageous, and they break into the houses of the Taranchis, steal the food from their tables, and beat their women and children. Not a man belonging to the oppressed races dares retaliate in the slightest degree for the acts of such scoundrels, for fear of exposing himself, his family, and even his witnesses to capital punishment.

On the 17th November Dr. Regel started for Sendji. This town is inhabited by Dungans, stands on the plain, and contains some handsome shrines and tombs. In its neighbourhood he saw the ruins of a large city, similar in character to those of the ancient renowned Turfan. On the road to Manass they saw frequent villages and stations, not badly arranged for the comfort of travellers. The apartments of the Chinese are decorated with furniture and pictures, but here their civilisation ends, the only other adjuncts to their wants are the opium-smoking apparatus and three wives. Should he light upon objects of European taste and luxury, the Chinese is at a loss how to use them. Thus, Dr. Regel saw a Chinese who was continually wearing six watches, all of which kept bad time. He found the Mahommedans far better acquainted with telegraphy, railroads, &c., whilst the Chinese tries to impose upon the European with false tales of his *tsian-tsiun's* (general's) troops.

At Manass our travellers came upon a curious illustration of Chinese justice. In front of the gates were exhibited the heads of two Sarts. A few days before, the Chinese, or Dungans, killed two Sarts in the street. By way of exacting a penalty for this murder two more were led to execution.

The traffic in Dungan children between Manass and Turfan is large, and Dr. Regel even was offered some of them at Turfan.

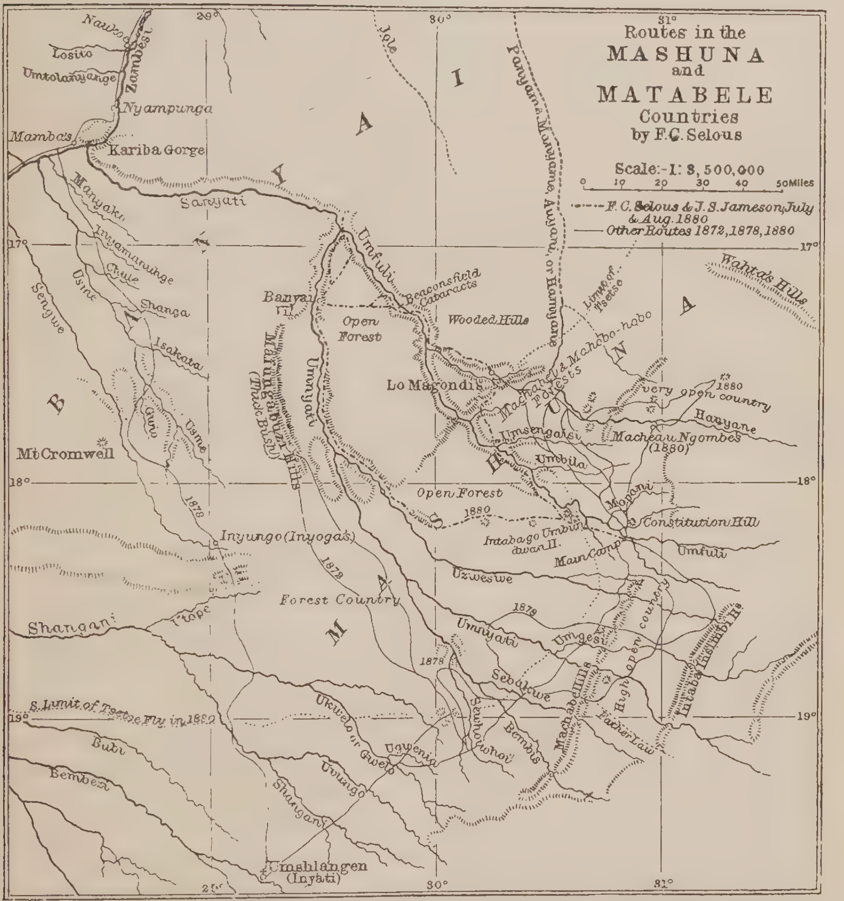
On the 26th November the travellers again arrived at Shi-ho, where the *tsian-tsiun* detained them by various artifices. On the 5th December Dr. Regel decided to start for Sigashu, where he overtook his men who had been sent on before. As frequently is the case in China, the wind suddenly changed: a brilliant convoy, comprising the son of the *tsian-tsiun*, escorted the travellers with flags and music to Djin-ho, but on approaching the Russian frontier, to the north of the Borborogussun valley, the whole Chinese escort dispersed, as a report had spread that a marauding band of Dungans was approaching, and Dr. Regel and his six servants were left to beat off the attack in the best way they could. In this, fortunately, they were successful, and on the 24th December returned in safety to Kuldja.

Recent Explorations in Mashuna-land. By F. C. Selous.

I SEND you a short account of a journey which I made with Mr. J. S. Jameson last year to the junction of the Umfuli and Umnyati rivers, in North-Eastern Mashuna-land, which by my reckoning is situated just about 200 miles slightly to the east of north from Inyati, the most northerly mission station in the Matabele country, and 100 miles to the south-west of the deserted Portuguese town of Zumbo, on the Zambesi.

On the 24th of July, 1880, Mr. J. S. Jameson and myself left our waggons, which were standing on the banks of the Umfuli river (not far from the spot marked Constitution Hill on Mr. Baines's map), and started on foot, on a trip into the "fly" infested country to the north of our encampment.

A four hours' walk through an alternation of open forests for the most part free from underwood, and broad grassy valleys, brought us to the banks of a fine clear stream, a tributary of the Umfuli, which ran at the foot of a hill known to the Kafirs as "Intaba go Umbundwan." As we still had our dinner to shoot, we went no further than this the first day, but spent the afternoon in search of game. We shot an oribi antelope and a reedbuck. The hill which I have mentioned above is about the southern limit of the tsetse fly on the western bank of the Umfuli, and from there it extends to the north and north-west without a break right up to the banks of the Zambesi: curiously enough, however, on the eastern side of the river there is a large area of country free from "fly" further north, extending as far as Lo Magondi's (Maghunda's) mountains.



E.G.L.

On the following morning about ten o'clock we struck the river again, and followed its course for the rest of the day. The scenery was similar in every respect to that we had passed through the previous day. We saw a great many waterbuck, and a good deal of rhinoceros spoor in the course of our march.

On the third day, July 26th, we got into a very rough hilly country, through which the river forced its way in a succession of foaming rapids, some of which were very picturesque, rushing as they did over and amongst great boulders of rock. These rapids were interspersed here and there with deep still pools of dark blue water, which must have harboured many herds of hippopotami at no very distant date, for the broad, well-beaten double footpaths made by these bulky beasts and leading from one pool to another, sometimes up and down very steep and rocky hillsides, were to be met with all along the river. All this day and the next we made our way through a series of the most exasperating stony hills that it is possible to imagine. Sometimes we had to keep away from the river to avoid hills that came down precipitously to the water's edge, and whose sides were too steep to afford a footing. Towards evening on the 27th we came to a large range of hills running east and west, and cutting the Umfuli at right angles.

The following day, as we had found game very scarce along the Umfuli, and as our Kafirs and we ourselves were almost entirely dependent upon our rifles for our daily food, we struck away to the eastward under the range of hills I have spoken of above, with the intention of trying our luck on the river Hanyane. In the course of the day we shot a sable antelope and a waterbuck, and in the evening struck a beautifully clear stream of water, which led us into a deep gorge through the hills. During the night a light drizzly rain fell. Early the next morning (July 29th) we made our way through the gorge into an open marshy valley between two ranges of hills, and after a struggle through an immense vley of long wet grass, struck a native footpath, which we at once followed. A three hours' steady tramp along this path brought us to some old mealie gardens and deserted huts, and just over the next ridge we came upon a small kraal which we found to be one of Lo Magondi's outlying villages, that august personage being a petty Mashuna chief, holding his life and property at the caprice of Lo Bengula, king of the Matabele. Finding that our Kafirs had meat which they were willing to sell for meal, ground nuts, &c., the villagers soon came trooping down to our camp, intent upon barter. As they were tired of a continuous vegetable diet, and our boys were equally tired of meat, the exchange was very brisk. The women usually brought the produce of their gardens down themselves in very small baskets or wooden plates, and then sitting at a little distance from us, gave them to some male friend to sell for them, keeping, however, a sharp eye upon the whole transaction, and assisting or hindering the barter with a never-flagging tongue. Altogether it was a noisy and amusing scene. The fashion of the huts and corn-bins, the tame pigeons flying in and out of the public dove-cot (these birds, originally obtained, no doubt, from the Portuguese, are to be found in every kraal along the Zambesi), the arms and dress of the men, and the wonderful way in which some of them had frizzed and got up their hair, all recalled to my mind a Banyai kraal on the banks of the Zambesi.

We now got a boy to show us the way to the chief's kraal, the path to which took us through another village and across a large extent of cultivated land. These people seem very industrious, cultivating large quantities of Kafir corn, maize, ground nuts, and a few sweet potatoes. They had any amount of vegetable food and native beer, and what they seemed to covet most was meat, fat if possible; but meat in any shape, lean, fat, fresh or putrid, was evidently to them a luxury. They have no domestic animals, either cattle or goats.

We found old Lo Magondi living in a small village, occupied apparently only by his own wives and a few intimates, and perched upon the summit of a very steep hill. When we reached the top, the old fellow, with some of his sons and a councillor or two, was seated on a bark mat, with a huge pot of beer in front of him. Two years previously, in 1878, having paid a visit to one of his other towns, and he himself having also brought some ivory to our waggons at Umfuli to sell, he at once recognised me, and offering us beer and ground nuts, became very friendly.

At this little kraal we noticed a man weaving a blanket on a native hand-loom, and out of wild cotton. We also saw that they had planted a few cotton bushes near the huts, and enclosed them with a hedge. Later on, when we were on the Umnyati, I noticed that at every Banyai village we visited, the people had planted and enclosed a few cotton bushes.

Old Lo Magondi dissuaded us from going down the Hanyane, saying that there was no game there, the country being thickly inhabited, and begged us to go with him to the lower part of the Umfuli and shoot some hippopotami for his people, as a reward for which he said he would consult his god, who would infallibly tell us where the elephants were to be found. He also stated positively that the Umfuli ran into the Umnyati, not many days' journey below where we were to find the hippopotami. This last statement decided us to give up the Hanyane and follow down the Umfuli to its junction with the Umnyati, so as to establish the fact, for in all maps of South Africa hitherto published, the Umfuli is marked running into the Zambesi about half-way between the Umnyati and Hanyane rivers.

The following day we started. Although we took two days to do it, having to go at Lo Magondi's pace, it is only a day's walk from his town to the junction of a small stream (which runs past his town) with the Umfuli. We kept a general course of north-west through a very rough hilly country, crossing one high and steep range. From the top of these hills, as far as the eye could reach to the north, north-east, and north-west, the whole country seemed to be a mass of wooded hills. On the morning of July 31st we again followed the bank of the Umfuli northwards. In the course of an hour we passed some magnificent pools, several hundred yards long, at least 200 broad, and seemingly very deep. Here for the first time I saw a beautiful species of plantaineater, new to me, of a dark metallic purple colour, with a crest that appeared black, and bright scarlet wings. About nine o'clock we reached a pool in which seven hippopotami were located. Of these we shot five, and then made a camp in order to dry the meat. Here we remained for a week, during which time I made an excursion to the Umnyati, which, although the natives with Lo Magondi swore it was three days' journey distant, I found to be not more than 25 miles to the west of our camp, as the crow flies; at least that is the distance I judged it to be. A few miles below our camp there is a waterfall on the Umfuli. At the falls the river runs over and amongst huge boulders of granite rocks in three channels, altogether quite 300 yards broad, and when swollen by heavy rains, these streams must all be united into one broad expanse of seething water, foaming over a bed of solid rock, and at such times could not fail to present a grand and awesome sight. There are three small falls, which are, however, insignificant at this season of the year, the highest being that on the eastern side, which falls into a deep hole that the water has worn in the solid rock. These falls Mr. Jameson and I afterwards named the Beaconsfield Cataracts. Where I first struck the Umnyati I found it running amongst a succession of low wooded hills, its bed being about 200 yards broad, and sandy. Here I found several Banyai villages, and learnt from the people that it was only a day and a half's journey to the junction of the rivers, so I determined to return to our camp, and then with Mr. Jameson start for the junction at once.

On again reaching camp, I found that Jameson had just returned from an excursion to the south-west. Old Lo Magondi was still here with half his tribe, women and children, all of whom were trying to devour as much hippopotamus meat as possible. Poles had been cut and raised upon uprights in every direction, all of which were red or white with festoons of meat and fat. The trees that surrounded the pool were covered one and all with the griffon and little black vultures, and here and there sat a couple of the carrion-eating marabout storks, eyeing the bones and ribs of the five hippopotami, now well picked, which strewed the rocks at the lower end of the pool. As soon as darkness set in, hyænas began to approach from all quarters, and laughed and screamed and howled over the remains of the feast in a manner that must be heard to be appreciated. In the middle of the night, when the fires were burning low, old Lo Magondi, who always slept at our scherm amongst our Matabele boys, suddenly jumped up and called to the Kafirs to make up the fires, as there was a lion about. Though I was awake, I had heard nothing; but soon after the boys had rekindled the fires, a low deep growl—of disappointment, I suppose—broke the silence of the night, such a growl as can only issue from the throat of a lion. The deep sullen sound was twice repeated, seemingly within 50 yards of where we lay, and then all again was still; nor were we further disturbed that night.

Next day we packed up our traps, and crossing the Umfuli at the Beaconsfield Cataracts, made for the Banyai villages on the Umnyati, which we reached by midday on the morrow.

The following morning we were up betimes, and leaving four of our Kafirs to look after the bulk of our traps, started with the rest for the junction of the rivers, taking our blankets, some ammunition, and provisions for a week. Getting a guide from one of the Banyai villages, we held away through a very hilly country to the north-east, and early the following morning found ourselves once more on the banks of the Umfuli, very near, as our guide affirmed and we afterwards found to be the case, to its junction with the Umnyati. We were delayed, however, during the rest of the day looking for game. We killed a waterbuck, a wart-hog, and a buffalo bull.

Here, as higher up, the Umfuli runs through a succession of rocky gorges, dashing over and amongst great masses of granite rock. Through these ravines hippopotami must have wandered for countless ages, for in one place, where a ledge of rock ran along the bank of the river, they had worn a path about 20 yards long across it, at least four inches deep in the hard stone. This path, worn into the solid rock, was the very facsimile of those recently made in soft ground, having, as in them, the slight ridge all along the centre, which is caused by the hippopotamus not crossing its feet as other animals do, but moving them in parallel lines. The time required for a limited number of these animals to wear a path four inches in depth into this excessively hard rock, seems almost beyond calculation.

August 11*th.*—Up again at daylight, and after a two hours' scramble, at last reached the junction of the two rivers. Although there are large deep pools more than 100 miles nearer the sources of the Umfuli, yet it only pours a narrow stream of water, three or four yards wide and knee-deep, into the Umnyati at this season of the year. The Umnyati itself is narrow and rocky just at this point, but a little below the junction it opens out into a sandy bed, fully 400 yards broad, through which two or three narrow channels of water find their way.

Just below where the waters of the two rivers met, there was a fine deep blue pool, in which a herd of about ten hippopotami were disporting themselves.

The Umnyati here runs to the north-east, and the Umfuli enters it almost at right angles. About four miles below the junction, however, the river runs right against a chain of hills, and then taking a sudden turn, flows along their base towards the north-west, which is the general course it must hold until it finally empties itself into the Zambesi just at the entrance to the Kariba gorge.

On the 13th of August we commenced our journey homewards, and followed the banks of the Umnyati until we reached the mouth of the Umzweswe, one of its chief tributaries. This I have placed further north than it has been marked on Mr. Baines's map. The Umzweswe joins the Umnyati amongst a mass of rocky precipitous hills, through which we found it very tedious work to make our way. In spite of their stony character, these hills are, however, for the most part wooded. After following the course of the Umzweswe for a day and a half, we left it, and struck away nearly due east, through an alternation of forests and valleys, intersected by several fine running streams of beautifully clear water, and eventually struck the Umfuli about 12 miles below our camp, which we reached on August 30th, after an absence of nearly six weeks. During our return journey, we fell in with two elephant bulls, which we killed, besides a great many buffaloes, black rhinoceroses, and hippopotami. My friend also shot a fine lioness.

April 26th, 1881.

GEOGRAPHICAL NOTES.

Mr. H. M. Stanley's Expedition on the Congo.—M. Devaux, Chef du Cabinet to His Majesty the King of the Belgians, has lately communicated a long account of Mr. H. M. Stanley's proceedings on the Congo to the *Daily Telegraph*, in connection with which journal his former explorations were carried out. The greater part of M. Devaux's report covers tolerably well-known ground, including the establishment of the station at Vivi, but towards the close we learn something about the difficulties experienced in reaching the second station. Mr. Stanley had selected as the site for this a place called Isangila, situated some 30 miles above Vivi. To reach this point he had to traverse a very irregular country, sparsely populated, and without available resources for support. His provisions, boats, and the materials for the new station altogether weighed 42 tons, and they were carried partly on men's backs, and partly in waggons furnished by Messrs. Woolf, of London. With this amount of baggage—an immense quantity when the means of transport and the nature of the country are considered—Mr. Stanley commenced his march to Isangila. The difficulties he had to encounter were often serious; sometimes torrents had to be bridged over or ravines filled up, and at other times a road had to be cut with axes through dense forests, and rocks had to be blown up; sometimes, again, steep mountains were met with, along the sides of which the waggons had to be dragged by sheer strength of arm. If, however, Mr. Stanley could have moved forward with all his baggage at once, his difficulties would not have been so great, but this appears to have been out of the question. He went on at the head of an advance party, and after surmounting the various obstacles and marching some distance, he halted and formed a camp. Then he had to return—more or less often according to the nature of the country—and bring on the remaining convoys one after the other, until all were collected together. In this manner eventually he arrived at Isangila. Mr. Stanley has lately received twenty mules from Teneriffe, and it is to be hoped that they may turn out to be more serviceable than donkeys have proved in the case of Mr. McCall's and Mr. Comber's expeditions. Before taking any further steps, Mr. Stanley was awaiting the arrival of the important reinforcement of seventy-two natives from Zanzibar, who are coming round by way of the Cape. In conclusion, it may be interesting to add a few words respecting the little flotilla which Mr. Stanley has at his disposal. It consists of the following vessels:—A small steamer, *La Belgique;* three steam-launches, *L'Espérance, L'En Avant* and *Le Royal;* and two steel whale-boats. *La Belgique* and *L'Espérance* are employed in keeping up communication between Vivi and Banana, while the remainder of the little fleet is destined for the navigation of the Upper Congo.

M. Savorgnan de Brazza's Journey from the Ogowé to the Congo.*— M. de Brazza arrived at the Gaboon on December 27th, 1879, having been sent out by the French Branch of the International African Association to choose the site for a station on the Upper Ogowé. This station he founded at the mouth of the river Bassa, an affluent of the Ogowé from the left bank, giving it the name of Franceville, and placing M. Noguez in temporary charge. In July 1880, M. de Brazza left the station, and having traversed the country of Létéké, arrived in four days at the river Alima, which he had discovered during his previous journey with Dr. Ballay. He was then close to the plateau of the Batékés, 2600 feet above the sea, which is inhabited by the Achycongos, Ballalis, and Bayakis, and lies between the Alima and Mpaka, both tributaries of the Congo. The region is very fertile, and its large and peaceable population is subject to Maskoko. With the friendly cooperation of the chiefs, M. de Brazza descended the Lefini, which Mr. H. M. Stanley named the River Lawson, to Pulobos in the centre of the country of Ubangis (Apfurus), a warlike people, who gave Mr. Stanley so hostile a reception, and had opposed his own passage in his previous journey. He was determined to come to a peaceable understanding with these people, and a treaty of peace and friendship was entered into with them. After this Maskoko ceded to M. de Brazza the territory Méuma or Ntamo, on the banks of the Congo, not far from Stanley Pool. Here the French flag was hoisted, and three of M. de Brazza's men were left in charge of the new station, until the arrival of M. Mizon or M. Stahl. At the meeting of the Geographical Society of Paris, on January 21st, as we have already reported, it was unanimously resolved, at the instance of M. de Quatrefages, to call this station Brazzaville, after its founder. The country between Franceville, on the Ogowé, and Brazzaville (Ntamo), on the Congo, is open and healthy, and a road could easily be made through it. In three months M. de Brazza had traversed this, concluded a treaty of peace with the natives, and obtained the cession of the territory above-mentioned. On October 10th he started on his return journey, following the bank of the Congo for some distance, in order to ascertain the geological nature of the region between the plateaux of Maskoko's country and the Atlantic. He found that the course of the river is crossed by chains of mountains, varying in height from 6500 to 10,000 feet. Numerous affluents of the Congo rush down from the plateaux, cutting the mountains into ravines, and rendering the construction of a road impracticable. The country, too, is inhabited by hostile tribes. On November 11th, he arrived at Mr. Stanley's advanced post, some 25 miles above Vivi. He afterwards proceeded by sea to the Gaboon, which he reached on December 10th. Not finding Dr. Ballay and M. Mizon there, he started again for the Upper Ogowé, lest his men, who had been there six months, should imagine they had been abandoned. During March, it is expected, he will have been joined by Dr. Ballay and MM. Mizon and Stahl, when the two latter will take charge of the Association's stations, and MM. de Brazza and Ballay will proceed on the journey of exploration, for which funds have been liberally supplied by the French Government. They are to descend the Alima to the Congo in a steam-launch, and then to make a thorough examination of the valley of the latter river, the area of which is estimated to be four times that of France. The countries drained by the Congo are extremely rich in natural products, for a portion of which it is hoped that an outlet may be found by the Gaboon through the agency of M. de Brazza's expedition.

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* See *ante*, p. 182.

Livingstone (Congo) Inland Mission.—With reference to a note in our March number,* we are informed by the Honorary Secretary of the East London Institute for Home and Foreign Missions, which now superintends the work of the Livingstone (Congo) Inland Mission, that Mr. McCall's party have arrived at Manyanga, and that the mission has now five stations in the first 200 miles up the Congo. When he last wrote, Mr. McCall expected to plant a fresh station shortly at the mouth of the Edwin Arnold River, some miles higher up than Manyanga, and another during the present season at Stanley Pool. Reinforcements have lately been despatched to join the expedition, and a small steam-launch has also been sent out for the navigation of the Lower Congo as far as Mataddi Minkanda, and to facilitate the transport of stores.—We have also been favoured with copies of Mr. McCall's latest letters, which furnish some particulars respecting his proceedings and plans. Early in October he learned that the natives intended to oppose the progress of his party by land, and he accordingly moved down to the river to make further inquiries, when he finally decided that it would be best to proceed by river in canoes. He accordingly hired two canoes for a month, and sent his donkeys back to Banza Montiko, as they had been found to hinder progress and to be the very worst means of conveyance. Mr. McCall eventually started from what he terms the Riverleigh camp (one day above Banza Montiko) on October 21st, and arrived at Manyanga on the 27th, after a passage of varying fortune. As he and his companions did not know the river or the rapids, they had to make their way as best they could; they had to cross the river three times to avoid the rapids, and once one of the canoes was swamped. Now, however, that they understand the navigation, their native boys are able to go up to Manyanga from Riverleigh in three days, and return in one day. The spot from which Mr. McCall wrote was Little Manyanga, Manyanga, the market, being half a day's journey distant. He found the natives on the north side far better to deal with than those on the opposite bank, and although they were rather reluctant to allow him to stay on his first arrival, they behaved well afterwards, bringing abundance of provisions—plantains, mandioca, peanuts, kanke (prepared cassava), fowls, goats, pigs, eggs, &c.—so that Mr. McCall was able to send supplies to his less fortunate companions lower down the river. After their arrival, he intended to visit both sides of the river, there being large markets on each, before deciding where the ground for the station should be purchased; and whilst the station was being formed, he proposed to go on exploring the river as far up as possible. Mr. McCall has determined to proceed to Stanley Pool by the river, for many reasons, which he gives in his letter, and he believes that many, and perhaps the majority, of the intervening falls and rapids can be passed in canoes; indeed, he has already passed one, the Ntombo Mataka Falls of Mr. Stanley's map. The following is Mr. McCall's own account of his plans for the immediate future:—

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* See *ante*, p. 176.

"From this place [Manyanga] to Stanley Pool it is just 135 miles by the river, and in this distance Stanley only left the river twice, only once with his canoes, and both times for short distances; if we can do the same, that is to say, if we can pass all the falls and rapids with two exceptions, then we can manage with only three relays of canoes, three sets of two or three canoes; we already have one set of two canoes (which I purchased here for less than twenty shillings each); this set now runs backward and forward between here and Riverleigh, which is only half a day's walk from Banza Montiko. These two can run (I hope and expect) three days farther up, that is, to where the Edwin Arnold River comes in. In connection with this set I intend, if possible, to arrange two (or more) other sets to reach right up to Stanley Pool, and if I can succeed in doing this, we shall be able to go from here to Stanley Pool in about fourteen days, or say twenty days to allow for contingencies; and therefore I may say, unless prevented by unforeseen obstacles or adverse circumstances, we can reach Stanley Pool very early next season [i. e. this year]."

Since the foregoing was written, intelligence has reached the heads of the mission in London that Mr. McCall had been obliged to return temporarily to the Lower Congo, in consequence of new arrangements being necessitated by the death at Paraballa of Mr. Hugh McKergow, who had been stationed at Mataddi Minkanda. This station has proved so unhealthy for Europeans, that Mr. McCall has determined to abandon it, and in its place he proposes to build a store at Noki, 12 miles below Vivi, the charge of which will be committed to the agent of a French mercantile house, so as to avoid the necessity for the residence of missionaries on the lower river except at Banana.

The Baptist Missionary Society's Expedition to the Upper Congo.—When our May number was passing through the press, further intelligence reached the Baptist Missionary Society from Mr. Comber. On January 8th he started with Mr. Hartland to make the fresh attempt, to which we alluded,* to reach Stanley Pool by the old Makuta road. They were, however, soon foiled by the old trouble about carriers, for they were deserted by their Kroo boys, who had become alarmed after a few days' march by reports of danger. Mr. Comber and his companion were accordingly obliged to return to San Salvador, which they left again almost directly for the river, with the view of helping Messrs. Crudgington and Bentley on their return from their exploratory journey on the north bank of the Congo. At the date of the latest letters (February 21st) Messrs. Comber and Hartland were at Banana. For the present, Mussuca has been fixed upon as the depôt for the expedition, and a rough storehouse is being erected on a plot of ground purchased for the purpose. If, however, the north bank expedition should prove successful, it is probable that the depôt will be formed at Vivi. The change in the plans of this expedition is probably to some extent due to the arrival of a Jesuit missionary expedition, consisting of four members, who are said to be under a contract to remain for at least five years in Congo. They were escorted to San Salvador by two Portuguese naval and military officers, with a party of marines, and they take with them, as presents from the King of Portugal to Dom Pedro V., "a piano, large silver tankards and cups, several kegs of rum, large cases of gin, gold cloth, &c.," according to Mr. Comber's last letter from Banana.

At the last moment we learn † that Messrs. Crudgington and Bentley returned to Vivi on March 2nd. They met with some difficulties in their journey up the river, but after twenty-one days' walking, arrived at Mfwa, near Mankoneh's village, at Stanley Pool. They crossed the pool from Mankoneh's village to Ntamo or Kintamo, where they remained two days; but finding that the natives did not wish them to stop, they went on by land to Nshasha or Kinshasha, where the natives were even worse, owing probably to a misunderstanding. This appears to be the locality of M. de Brazza's station, and notwithstanding all that the French sergeant in charge said, the natives, finding that Mr. Crudgington and his companion were not Frenchmen, could not be persuaded that they were not enemies. They accordingly made the best of their way back to the opposite side of the river, and shortly afterwards commenced their return journey, which was accomplished in fifteen days, partly by land and partly by water.—We hope to be able to furnish fuller particulars respecting this interesting excursion in a future issue.

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* See *ante*, p. 310.

† For this information we are indebted to the courtesy of Mr. A. H. Baynes, the Secretary of the Baptist Missionary Society.

The Native Tribes on the Ogowé.—When M. de Brazza ascended the Ogowé again in December 1880, he was accompanied by Père Delorme, whose object was to find a suitable spot for a mission-station. In a letter which he has addressed to his superiors on this subject, he has embodied some information respecting the native tribes met with on the banks of the Ogowé, from which we obtain the following particulars. On the lower course of the river some Orungu villages are met with, inhabited by the Nkomis and Camas. The country here lies very low, and being inundated during the great rains, is unhealthy. Further up river the country becomes more and more open, pleasanter, and higher above water-level; while the mangrove thickets disappear, and are replaced by forest trees, including the date and other palms. After the Nkomis and Camas come the Galois, Eningas, and Adyombas. All these tribes speak the same language as is used on the Gaboon. They are all very superstitious, but do not appear to be fanatical like the people about Cape Lopez. One hundred and ten miles up the river are found the Bakalais, who are being driven away by the numerous Pahuins; the latter occupy the right bank of the river and the former the left bank, and there is continual war between them. Père Delorme says that the Pahuins will do here what they have already done in the Como (Commi) country and on the Rembo, and will end by remaining masters of the region, as they are the stronger of the two tribes. They are not enervated by vice, and have no slaves, and consequently no human sacrifices. After passing these tribes, the rapids are reached, rendering navigation very difficult and dangerous. Above these the river again becomes navigable, and different tribes are met with along the banks, such as the Okandas, Oshébas, Adumas, Ondumas, &c. On many grounds, Père Delorme thought the time had not come for establishing a station above the rapids, and he therefore did not accompany M. de Brazza through the Okanda and Aduma countries; but he speaks in high terms of the friendly understanding which evidently exists between him and the inhabitants. Père Delorme afterwards went 50 miles up the Ngunié, a considerable affluent of the Ogowé, and found there several localities suitable for stations. The tribes on its banks are chiefly the Ivilis, Ivetylas, and Ishiras. Large numbers of slaves are obtained from this region, as the people are gentle and exceedingly poor.

French Expeditions to the Niger.—We are indebted to the Foreign Office for the latest information which has reached the French Ministry of Marine from Senegal respecting the expeditions of Captain Gallieni * and Colonel Desbordes † in West Africa. Captain Gallieni, who had been for some time with Ahmadu, Sultan of Segou, had at length been allowed to leave, and arrived on April 10th at Medina, a French post on the Senegal. Ahmadu has been informed by the Governor of Senegal of the recent occupation of Kita, which is described as a sort of mamelon, about 800 feet above sea-level, situated some 34 miles south-east of Bafulabé, and 37 miles north-west of Bamaku on the Niger, and dominating the valley of the Bakhoy, a tributary of the Senegal. In consequence of its strategical importance, Colonel Desbordes established a post here some three or four months ago. The Sultan of Segou has also been informed of the occupation of Bubanko, a Bambarra village 12 or 13 miles south of Kita, where a number of robbers of the Bambarra, Mandingo, and other tribes, had collected together, pillaging their neighbours and harassing French convoys. Captain Gallieni brings back with him a treaty, which he has concluded with Ahmadu, and by which the French are authorised, to the exclusion of other nations, to found establishments throughout the kingdom of Segou, and to open a route to the Niger, which will be placed under French protection as far as Timbuktu. Provision is also made for the residence of a French representative at Segou.—Major Derrien, chief of the survey staff of Colonel Desbordes' expedition, has also just returned to Medina from Kita, and brings back with him satisfactory information respecting the topography of the region between Bafulabé and Bamaku, which proves to be a vast plain with a gradual rise of 500 feet in 75 miles. Colonel Desbordes, the chief of the expedition, was to leave Kita on May 5th, and return to St. Louis for the rainy season.

Climate of Cochin-China.—The climate of French Cochin-China, though probably not likely ever to become a very salubrious one, does not appear in late years to have been so fatal to Europeans as formerly. The deaths, which were 268 in 1876, rose to 324 in 1877, but they fell to 156 and 103 in 1878 and 1879 respectively, and that too with an increased population. From six years' observations recorded in 1874–9, the mean temperature at Saigon was about 80°·6 F., the maximum being

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* See *ante*, p. 311.

† See vol. ii. p. 690.

93°·88 F. and the minimum 75°·38 F. The mean of the rainfall for the five years 1874–8 is stated to have been about 54·46 inches per annum.

The True Name of the Chukches.—With regard to a statement made in our January number* respecting the Chukches (Tchuktches), Lieutenant Nordqvist, one of Professor Nordenskiöld's companions in the *Vega*, has communicated some remarks to the Imperial Geographical Society of St. Petersburg,† maintaining that Mr. W. H. Dall is in error. According to Lieutenant Nordqvist, the stationary and nomad Chukches both belong to the same race, and call themselves in the singular "Chauchau," and in the plural "Chauchau-ate." These people, he says, live to the north of Cape Chukotsky, and must not be confounded with the true Eskimo, who live to the south of it, chiefly on the shores of the Gulf of Anadyrsk, as far as Cape Oliutorsky—a fact which, Lieutenant Nordqvist urges, is incontestably proved by a comparison of the idioms in the languages of the two peoples.

Richmond Gulf, Hudson's Bay.—In a paper on his recent explorations round Hudson's Bay, which he read during the last session of the Geographical Society of Quebec, Professor R. Bell, Assistant Director of the Geological Survey of Canada, alludes to this remarkable sheet of salt water on the eastern side of Hudson's Bay. He describes it as triangular in outline, and measuring about 25 miles from north to south and 15 miles along the base from east to west. It is connected with the sea by an inlet only a few chains wide, but a mile in length, cut through the high ridge, which lies between it and Hudson's Bay to the west. This inlet is too narrow to allow the whole gulf to fill up with every rise of the tide, or to empty itself at the ebb to a level with the low-water mark outside; and the result is that, with the exception of a few minutes at each rise and fall, the water rushes alternately out and in through this rocky gorge, causing whirlpools and eddies which are sometimes dangerous. The water of this place is open all the winter, and the locality is resorted to by water-fowl, seals, and white porpoises, which are also numerous there in the summer. Just within the entrance to the gulf a mountain of rock, resembling an enormous castle, rises to a height of 700 or 800 feet, and near the south shore there is a large island, on the eastern part of which is a bare mountain several hundred feet high. On the top of this, Dr. Bell and his party built a cairn, which will probably last for ages and serve as a memorial of their visit. From the top of the surrounding mountains beautiful lakes, high above the sea-level, are seen stretching far away among the lofty hills.—Dr. Bell also makes some interesting remarks in regard to the character of the coast-line of this part of Hudson's Bay, which is somewhat peculiar. After passing the most prominent cape on the east coast (N. lat. 58° 45′), which he named Cape Dufferin after our late President, the coast becomes somewhat lower than it was to the south, and from the Manitounuck Sound to a point 32 miles north of the inlet of Richmond Gulf, the rocks of supposed Nipigon age are largely developed. They everywhere dip into the sea, and hence the cliffs all face inland, or in the same way as those of the chains of islands which line the coast. This constitutes a remarkable feature in the appearance of the coasts.—Altogether, the scenery in the neighbourhood of Richmond Gulf is stated to be extremely wild, lonely, and grand.

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* See *ante*, p. 49.

† Bulletin, fasc. ii. of 1881.

Obituary.

Admiral Baron de La Roncière-le Noury.—It is with the deepest regret that we announce the death of Vice-Admiral Baron Clément de La Roncière-le Noury, President of the Geographical Society of Paris, which occurred on Saturday evening, May 14th.—Admiral de La Roncière-le Noury, who was the son of a distinguished officer of Napoleon I., was born in 1813 at Turin, where his father was in military command of the district. During his long career in the French navy, he achieved a high reputation for gallantry and professional skill; he served with distinction in the Crimean war, and was afterwards appointed to the command of *La Reine Hortense* on the occasion of Prince Napoleon's expedition to the Polar regions. More recently he commanded the squadron which brought back the French troops from Mexico, and added greatly to his reputation by his services when commanding the Marines during the siege of Paris by the German armies; he afterwards filled the important post of Commander-in-Chief on the Mediterranean station. He was always a true and earnest friend to science in all its branches, but more particularly in the departments of geography, botany, and zoology. He became a member of the Geographical Society of Paris in 1857, and for several years held the office of President, in which capacity he welcomed to Paris some of the leading explorers of recent years—Commander V. L. Cameron, Mr. Henry M. Stanley, Professor Nordenskiöld, &c.—and presented them to the President of the French Republic. He came to London on the occasion of Livingstone's interment in Westminster Abbey, and represented French geographers in the funeral cortége.—Admiral de La Roncière-le Noury was elected an Honorary Corresponding Member of our Society on April 27th, 1874.

Sir D. B. Robertson, C.B., K.C.M.G.—We regret to announce the death, on March 27th, in Arlington Street, Piccadilly, of Sir Daniel Brooke Robertson, who had been for a great number of years in the Civil Service of the Crown, and for more than twenty years a Fellow of our Society.—Our associate was the eldest son of the late Mr. Daniel Robertson, of Struan, Perthshire, and was born in 1810. He was called to the Bar in June 1840, and was employed in the Mixed Commission for the settlement of the claims of the British Legion on the Portuguese Government in 1842. He was appointed Vice-Consul at Shanghai, China, in December 1843, and Consul at Amoy in August 1853. During his long residence in China, Sir Brooke was stationed for many years at Shanghai, but the latter part of his time was spent at Canton, for which port he was appointed Consul in December 1858. He acted for some time as one of the British Commissioners there during the occupation of the city by the British and French troops, and in January 1861 was appointed British Commissioner for what is known as the Kowloon Peninsula, opposite the island of Hong Kong. Our associate was made a Companion of the Bath on August 9th, 1865, and received the honour of knighthood (by patent) on June 8th, 1872. In October 1877, Sir Brooke was appointed Her Majesty's Consul-General at Shanghai, but did not take up the post. He retired from active service on April 1st, 1879, and was made a K.C.M.G. in the following August. The successive honours and promotion conferred upon him during a life-long service are sufficient evidence of the high esteem in which he was held by Her Majesty's Government and the several Ministers under whom he served in China. Few public servants have left more friends or fewer enemies.

CORRESPONDENCE.

Longitude of Lake Nyassa.

GLASGOW, *4th May*, 1881.

DEAR SIR,—In the discussion on Mr. Stewart's paper, in the 'Proceedings' for May, I observe that my friend the Rev. Horace Waller says that I am atoning for having pushed Lake Nyassa too far westward; but if he will look at the map in the pamphlet distributed among the audience at the time to which he alludes, he will see that the longitude of the north end of the lake in this map, made in 1876, agrees with the longitude in Mr. Stewart's map.

More recent surveys had given a different position to the south end of Lake Tanganyika, and in requesting Messrs. Stewart and Moir to explore for a route between the lakes, I gave them 177 miles as the direct distance of Pambete, which is 40 miles further than in the map made in 1876. As the nearest distance from one lake to the other in a straight line proves to be 173 miles, this was also a very fair anticipation.

My map was of course the interpretation which various reasons led me to put upon Mr. Young's discovery of the northern half of Lake Nyassa. After his return, from his description of what he saw, I sketched, in a second edition, the Konde Mountains as a continuation to the north-west of the Livingstone range, very much as Mr. Stewart now has them. The country between the lakes is also marked as a plateau 5000 feet in elevation, which proved also to be fairly correct.

I may be allowed shortly to explain why I attached considerable importance to the early solution of this geographical question.

Shortly after Livingstone's interment in Westminster Abbey, I was consulted by Dr. Stewart, the able superintendent of the Industrial Missionary Institution at Lovedale in South Africa, as to a suggestion he had just made in the Free Church Assembly, that a memorial mission to be named Livingstonia should be established somewhere in Central Africa. My feeling was that it would be the wisest and most fitting course at the same time to carry out Livingstone's policy by locating it where there was easy access by water, and it was accordingly submitted to the general public through the press a day or two afterwards as a mission to Nyassa.

The chief responsibility of placing it within the Portuguese coast-line lying upon me, and some inconvenience having resulted, it was a relief that Mr. Young's discovery of the northern part of Lake Nyassa, when rightly understood, showed that the Portuguese were in a position by this route to compete with Zanzibar for the trade of Central Africa, if their policy were wisely directed. The publications in which I endeavoured to place this in a clear light, were transmitted to Lisbon by

H.E. Viscount Duprat, so that the argument may have given some guidance in carrying out the enlightened views of the Portuguese government, in the arrangements which followed, which have entirely removed the objection to placing the mission in its present position.

Without correction of the map the argument had no force, and it is well now to find it to be scientifically determined that the correction in longitude of 120 miles was not excessive.

Yours faithfully,
Jas. Stevenson.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Eleventh Meeting, 9th May, 1881.—The Right Hon. Lord Aberdare, President, in the Chair.

Presentations.—*F. J. Campbell, Esq.; Guy M. Campbell, Esq.*

Elections.—*Lewis Philip Harris, Esq.; William George Lardner, Esq.; Cecil B. Phipson, Esq.*

The paper of the evening was—

"A Journey among the Great Andes of the Equator." By Edward Whymper. (Will be published in a subsequent number of the 'Proceedings.')

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—April 22nd, 1881: M. Daubrée, of the Institute, in the Chair.—The Chairman, in speaking of the losses the Society had recently suffered by death, alluded first to the learned geologist, M. Delesse, of the Institute, who had been President of the Central Committee in 1875 at the time of the International Geographical Congress. M. Grandidier had delivered over his grave an oration which he published in the Society's *Bulletin*. M. Daubrée also paid a tribute to the memory of Colonel Flatters and M. Béringer, members of the Society, as well as their unfortunate companions, who had been so cruelly massacred in the Sahara. It was stated that a proposition would be brought forward to place a commemorative inscription in the hall of the Society, in order to perpetuate the names of these martyrs to geographical science.—A sketch-map on the scale of 1 : 200,000 had been received from Captain Bernard of the region of the Ksurs in the Tidekelt oasis, based on information collected among the Shaambas by Colonel Flatters.—A letter was read from M. Lemyre de Villers, Governor of Cochin-China, announcing the arrival at Saigon of a chief of the wild independent tribes, who was desirous of entering into commercial relations with the colony. The Governor had taken advantage of the opportunity to send back with him Dr. Neis, a naval surgeon, who had recently returned from a journey of exploration before referred to.*—Dr. Harmand afterwards gave some news lately received from Dr. Neis. He was then in the upper basin of the Dong-nai in company with the Chief Apao, who appeared to exercise real power over the people of the region, and was inclined to adopt measures to facilitate commerce with the country. The Governor had stated that he would do all in his power to assist scientific exploration in Indo-China.—

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* See *ante*, p. 242.

M. Henri Duveyrier gave an account of the destruction of Colonel Flatters' expedition, and of the political condition of the Tuareg country, which will be published in the *Bulletin*.—A letter was read from M. Raffray, Vice-Consul at Massowah, who had already made a journey in Abyssinia, stating that he had been charged with a mission to King Johannes, and placing himself at the disposal of the Society.—Captain Howgate, of the United States Army, gave particulars respecting two exploring expeditions to the northern seas, and announced the foundation of a meteorological station at Point Barrow.—M. L. Simonin read a paper in which he analysed and commented on recently published documents relating to the statistics of the United States.

——— April 29th, 1881.—General Meeting.—In the absence of the President, Admiral Baron de La Roncière-le Noury, the Chair was taken by M. ALPHONSE MILNE-EDWARDS, of the Institute.—The Chairman delivered an address, which will be published in the *Bulletin*, on the value of geography as a science; and M. Hüber, the reporter-general of the Prizes Committee, expressed his views on the *rôle* of the Geographical Society in the domain of science, civilisation, and international interests.—The great Gold Medal of the year was awarded to Major Serpa Pinto, a sketch of whose journey across Africa was given by M. Gravier, President of the Geographical Society of Lyons.—M. Maunoir afterwards read a report on the labours of M. A. Vuillemin, to whom was awarded the Gold Medal, recently founded by the sons of the late M. Erhard, in accordance with the provisions of their father's will.—M. Bainier gave an account of the journey of MM. Zweifel and Moustier to the sources of the Niger, undertaken at the expense of M. Verminck, a leading shipowner and merchant of Marseilles (Gold Medal).—M. Dutreuil de Rhins next recounted the difficulties which Captain W. J. Gill, R.E., had to overcome in his journey to Western China and the Tibetan frontier (Gold Medal).—M. Franz Schrader referred to the labours and journeys in Patagonia of Dr. F. Moreno, for which a Gold Medal was awarded to him, and in delivering this to him the Chairman took occasion to remark that his labours would facilitate the choice of the South American station for observing the coming Transit of Venus.—The business of the meeting was concluded by the report of Commander de Bizemont, of the French Navy, on the voyages to Franz-Josef Land and other parts of the Arctic regions, for which a Gold Medal was awarded to Mr. Benjamin Leigh Smith.—All the reports above mentioned will be published *in extenso* in the Society's *Bulletin*.

——— May 6th, 1881.—The meeting was held in the great hall of the Sorbonne, M. ALFRED GRANDIDIER in the Chair.—The Chairman gave expression to the regret which was felt at the prolonged absence through illness of Admiral de La Roncière-le Noury, who would have had great pleasure in presenting to the Meeting Dr. Crevaux and M. Lejanne, by whom so much had been done for the advancement of geographical science. He reminded his hearers that Dr. Crevaux had made three journeys of exploration in Guiana and on the Amazon, crossing the Tumac-Humac mountains for the first time, and exploring the Yari and the Paru, then the Iça and the Japura, and last of all crossing the Andes, and following the Upper Guyabero, and the course of the Orinoco.—Dr. Crevaux, who illustrated his lecture with numerous photographs, then gave an account of the incidents of his last journey, of the varied aspects of the country and of the natives. Having reached the Upper Magdalena, he had intended to have explored the Uapès (or upper course of the Rio Negro), but he learned from the *quineros* or searchers for cinchona, that in this he had been anticipated by an Englishman. He traversed the Cordillera and found some streams, which opposite to Neiva flowed to the east. On October 14th the travellers crossed the crest of the Cordillera at an altitude of about 3200 feet. They then followed the small streams which they met with down to the Guyabero, which was reached on October 20th. There they built a raft and commenced the descent of the river; but their raft being broken up in passing some rapids, they had to build another. On November 9th they passed the mouth of an affluent, the Âre-âre, down which the products of the Cordillera can be transported without danger. They found there some natives, the Mitua Indians, and purchased a canoe from them. The explorers were now, however, in great danger of perishing from hunger, as the natives carried off all provisions from the country round as they went along; but at last, towards the end of November, they reached the country of the Quiapoca Indians, where they met with a friendly reception. On December 13th they arrived at San Fernando de Atabapo, at the confluence of the Guaviare (Guyabero), Ynirida, Atahuapo, and Orinoco. After having passed a series of dangerous falls in their descent of the Orinoco, they had the misfortune to lose their sailor, Burban, who died from the consequences of a poisoned wound. At last they arrived at Bolivar and traversed the delta of the Orinoco, where they found the Indians in quite as primitive a condition as those of the interior. On March 3rd they left Port of Spain on their return to Europe.—During their journey MM. Crevaux and Lejanne traversed a distance of 2550 miles, of which 1275 miles were through a new country.

Geographical Society of Berlin.—April 2nd, 1881: Dr. NACHTIGAL, President, in the Chair.—After alluding in terms of profound regret to the deaths of Lieutenant Weyprecht, the renowned Arctic explorer, and M. Eugène Cortambert, Honorary President of the Geographical Society of Paris, the President communicated the latest news received from travellers sent out by the African Society. Dr. Buchner, in a letter from Malange, Angola, dated February 9th, had written as follows: "After leaving the territory of the Muata Yanvo, I made three attempts by the most northern of the Mussumba roads in order to penetrate into the very interior of Africa, and failed each time before I had advanced a distance worth mentioning, and the last time so completely that nothing remained but to return again into the region of comparative civilisation. Of the fifty-six carriers which I had with me when I reached the Kassai river only eight remained, the rest deserted. I passed the Kassai river in 8° S. lat., and there a report spread amongst the carriers that they would probably be eaten by the Tukongo, as they were very hostile; consequently, six of my carriers at once disappeared, taking arms and ammunition with them, and I was obliged to wander about in the trackless swamps without any guide. I travelled through the northern territory of Madaba, and made between the Luembe and Chihumbo river a second attempt to penetrate northward. After two days' journey I reached the territory of the Tambua Kostóng in lat. 7° 22′ S., and was again obliged to return to Lunda in consequence of the hostility of the natives there. All my carriers here became demoralised to such an extent that I ran the risk of being left alone with my thirty to forty loads. These reasons forced me to give up the project of reaching the Kiluasa—where the traveller Schütt was attacked—and penetrate in a westerly direction as far as the Kahungula. Notwithstanding the little prospect of success, I contemplated making here a third attempt to reach the Muata Kumpana, and arrive at the coast by way of Muene Puta Kassongo, as here was the last station where practicable roads lead northward, but the unfortunate occurrence of the desertion *en masse* of my carriers forced me to return to Malange."—The President, in commenting upon this intelligence, said this was another addition to the list of expeditions from which we expected so much, and which have failed in consequence of obstacles to which all African travellers more or less are exposed. Although they might reasonably expect that Dr. Buchner would bring home valuable scientific information, they must express their great regret at a second misfortune which has befallen this expedition, namely, the probable loss of the entire collection which

Dr. Buchner had sent to Europe by the English steamer *Benin*, which vessel came into collision with another near the English coast.—From the same part of Africa news had been received that Dr. Pogge, who had visited the territory of the Muata Yanvo six years previously, had arrived at the beginning of this year at St. Paul de Loanda in company with Lieutenant Wissmann, and had at once continued his journey to Dondo.—Eduard Flegel had sent a short letter, dated 6th November, 1880, with meteorological observations. This traveller visited the still unknown course of the Niger between Jauri and Say. Between Badjebo and Kpatachi the wide bed of the river consists of immense boulders, and it forces its way between these with great difficulty. In Kpatachi he was detained for six days, awaiting the return of his messengers, which he had sent to the ruler of Bussân, who is not subject to the Emperor of Gandu. After their return the traveller ascended the river in a canoe, but was frequently obliged to quit the same and transport his loads over land, because the enormous boulders in the river made navigation impossible. At the present time it is supposed that Flegel is with the chief of Bussân. He appeared to be in excellent health, and the prospects of his journey are very promising. The present leader of the German East African Expedition—Captain v. Schoeler—after conferring with his three companions, and also consulting the leaders of the Belgian Expedition, had selected a place called Kakoma, near Tabora, for establishing the German station; and having made all arrangements required for this object, had returned to Zanzibar, and his arrival in Berlin might be expected during the month of May.—After the President had made reference to the arrangements in progress in Germany for the Third International Geographical Congress to be held in Venice, Lieutenant Keitner, companion of Count Szechenyi during his journey in China, spoke of the country and inhabitants between China and Burmah.—The meeting concluded with a paper by Dr. Lehmann on the South Carpathian Mountains, especially the Togara range.

——— Special Meeting, April 12th, 1881: Dr. Nachtigal, President, in the Chair.—After an introductory address in which reference was made to the latest African exploring expeditions, the President requested Dr. Oscar Lenz to communicate to the Meeting the results of his journey. Dr. Lenz commenced by briefly alluding to his passage through the territory of Morocco as far as Tenduf in the Northern Hamada, which had been already communicated to the Society by letter. On May 10th, 1880, he left Tenduf with a caravan consisting of eight persons and nine camels, and after five days' journeying reached that part of the extensive dunes of the Sahara known by the name of Igidi; on the 29th May he arrived at the town Taudeni, in the vicinity of which are situated the rock-salt mines (long disused) from whence formerly thousands of camel-loads of salt were sent yearly to Timbuktu. On the 9th June his caravan reached Arauan, a lonely spot in the desert, without any vegetation, used as a place of rendezvous for all caravans coming from the north. Here is still living one of the instigators of the murder of the well-known lady-traveller Alexine Tinne, and it is said that all the effects belonging to the lamented Major Laing, who was murdered fifty-five years ago, are preserved here, but Dr. Lenz in vain attempted to see them.—This desert, according to his view, is not, as is generally supposed, an (old) dried-up basin of the sea, but a sandstone formation disintegrated by atmospheric influence; the journey through it was exceedingly toilsome, especially in the region of the "shifting dunes," where even the experienced leader of the caravan was not always able to find his way; and the difficulty was increased in the southern portion of the desert, where the hot sand-storms and a temperature of 113° (Fahr.) during the day made marching almost impossible, and the hours of night were employed for the journey. Dr. Lenz arrived in Timbuktu on the 1st July, and enjoyed during his stay of twenty days the hospitality of the chief of the town, whose dignity is inherited from the great family of Ruma, who immigrated from Morocco, under Sultan El Kahal.—After a lengthy description of Timbuktu, the inhabitants of which he gives as numbering 20,000, to which require to be added several thousands of traders during the caravan season, but which according to Heinrich Barth's statement is inhabited by only 13,000—he mentioned that trade and industry are on the decline, as they were already during Barth's time, owing to the incessant hostilities of the Tuareg and Fullani tribes. When Dr. Lenz left the town he proceeded westward by a hitherto unexplored track to Senegambia, which occupied from the 17th July to 2nd November, passing through Basikunnu, Sokolo, Bachuinit, Nioro, Kuniahari, and lastly the French station Medina, where he received an equally friendly reception from the commandant as afterwards in St. Louis. He was several times attacked by native bands of robbers, and on one occasion lost a great part of his baggage through pillage by a band of marauding Arabs belonging to the Alush Kabyle. The paper was illustrated by twenty-two sheets comprising a survey of the territory he traversed.

——— May 7th, 1881: Dr. Nachtigal, President, in the Chair.—The President, after having announced to the Meeting the loss of the French Expedition under the command of Colonel Flatters, communicated a letter from Dr. Gerhard Rohlfs from Gondar in Abyssinia, from which, as well as from another dated Massaua, April 10th, it appeared that the reported death of the Negūs John is not confirmed. Regarding the prospect of Dr. Stecker's journey, who was about to commence a survey of the east and south coast of Lake Tsana, near Debra Tabor, the residence of the Negūs, it was stated that any change in the government of that country would be most detrimental to the expedition, as the present ruler of Abyssinia had promised to aid as much as possible the scientific researches of Dr. Stecker. Gerhard Rohlfs met in Debra Tabor in the house of the Negūs with the most friendly reception, and succeeded in obtaining interesting collections in ethnography and natural history. (The traveller has since arrived in Berlin.)—From Dr. Hildebrandt, who is travelling in Madagascar, favourable news had been received, dated as late as the 23rd February. He started on the 17th January from Antananarivo southward, and in his journey to the Ankaratra mountains added considerably to his collection of fauna and flora, particularly in orchideous plants, but he was forced to descend again into the plain on account of the incessant rain; on the 12th February he reached Finanarantsoa; he collected several valuable specimens in the southern as well as in the northern and western parts of the island.—Dr. Pogge and Lieutenant Wissmann, in a letter from Malange dated February 2nd, reported their safe arrival at that place, but stated that they were not able to carry out their original plan of at once continuing their journey owing to the want of stores; the brothers Machado, who had supplied the former expedition, having to send for a fresh supply. Malange, as well as Pungo Andongo, had greatly declined since Dr. Pogge's last visit four years ago. Formerly a considerable number of well-to-do Europeans were settled there, but at present their number was reduced to about ten; partly through death, partly through emigration. Business was bad because the prices of their produce had greatly declined in Europe, and as the negroes still demanded their former prices, they preferred to take their goods direct to Dondo, where they could dispose of them to greater advantage, owing to a regular communication with vessels on the Quanza.—At Malange, Pogge met Dr. Buchner and Major von Mechow, who had returned from their journey in the interior. In the meantime a lengthy letter from Dr. Buchner had arrived, relating his misfortunes, which were already referred to at the last meeting. He writes:—"If I had succeeded on the Kassai river in getting a passage across the Papyrus lagoon without the assistance of the natives, I should have reached the territory of the independent 'Tubindi,' who are said to be cannibals; and a few miles further on, I should have come on a high road, on which the Kioko are accustomed to journey northwards to pillage and shoot elephants. But I had to give up the idea of reaching Nyangwe. I had here an unpleasant encounter with the chief Kalala Kanaka Ntamb; he summoned about 200 warriors, fantastically adorned, all of whom took up a sitting posture round our little encampment, and in an endless monotonous refrain of 'Moio Moio,' expressed their disapproval of my, to them, inconceivable objection to trading. Thousands of arrows in quivers were piled up, some firearms were also seen, but they appeared to be in want of gunpowder. Then more and more natives descended from the hills amidst a deafening noise of drums, bells, fifes, and trumpets made of elephant tusks; their faces were dripping with red paint, and they had ornamented their heads with tufts of feathers. It soon became clear that it was intended to rob us, for they insisted I should establish there and then a trading settlement, or otherwise pay a fine of five barrels of gunpowder and five guns, and forthwith quit their territory. Not being disposed to consent to such an audacious demand, I prepared for defence, and ordered my men to make ready for a fight. By my firmness I succeeded in considerably reducing their demand, and towards evening they agreed to accept an indemnity of cloth and cowrie shells."—After the reading of these letters, and enumerating the presents received, Dr. H. Kiepert submitted his general map (general karte) of Germany, which had been revised by his son, a map of middle Italy illustrating especially the ancient topography, a general map of the Balkan peninsula, and a map of the Tunis territory.—Dr. v. Danckelmann then read a description of a portable barometer constructed by himself, and the meeting concluded with a paper by Professor Dr. von Fritsch on the latest theories of earthquakes.

Geographical Society of Lyons.—March 3rd, 1881: M. Louis Desgrands, President, in the Chair.—After some remarks by the President respecting the arrangements in progress for the Congress of French Geographical Societies to be held at Lyons in August, Canon Christophe read a paper on the ancient historical course of the Rhone, which will be published *in extenso* in an early number of the *Bulletin*.—M. Coint-Bavarot afterwards read a paper, entitled "Fifteen Minutes in Russia," on what had been recently accomplished in that empire from an economical and geographical point of view.

Geographical Society of Bremen.—April 16th, 1881: Annual Meeting.—The Annual Report and Statement of Accounts were presented to the Meeting, but gave rise to no remarks.—It was announced that Herr Mosle had resigned the office of President, and he was elected an Honorary Member in recognition of his services to the Society. Dr. Oscar Lenz and Lieutenant Schwatka, U.S.A., were also elected Honorary Members.—The following were the chief items of information which were furnished to the Society in the course of this meeting:—The steamship *Mary and Helen*, which will be despatched from San Francisco by the United States Government early in June to search for the *Jeannette*, will be commanded by Lieutenant Berry, who has already made a voyage in the Arctic seas in the *Tigress*. The vessel will be equipped and provisioned for a three years' cruise, but it will be left to Lieutenant Berry's discretion whether he will remain out more than one winter or not. The vessel will proceed in the first instance to Petropaulofsky to embark dogs, sledges, drivers, &c., and then to St. Michael's to take in a further supply of coal, afterwards visiting several parts of the Chukche Peninsula, viz. Lawrence Bay, Cape Serdze Kamen, and Koliutshin Bay. In the early part of August the expedition will endeavour to push northwards to Herald Island, near which the *Jeannette* and the missing whalers were last seen in September 1879. Lieutenant Berry will next try to make the south-east point of Wrangel Land, where, according to Captain Dallmann, there is a large bay. From here sledge journeys will be made in search of the lost expedition, and the parties will perhaps be under the leadership of George Kennan, who has had a large experience of sledge journeys in Eastern Siberia. If necessary, the expedition will winter on the south-east coast of Wrangel Land or on the Siberian coast. It will consist exclusively of volunteers from the United States Navy, and will, no doubt, add considerably to our knowledge of the geography and hydrography of the region.—Dr. Arthur Krause and Dr. Aurel Krause (who were to start on April 17th in the ss. *Rhine*) are to go viâ New York and Washington to San Francisco to undertake a journey on behalf of the Society to the coast districts and islands of Behring Strait and Sea. Their precise programme will depend upon information which they will obtain in Washington. They will spend some time in the Chukche Peninsula, and will make investigations and collections in the departments of ethnology and marine zoology in Alaska. They are equipped for a year's journey, and have received much valuable assistance in their preliminary preparations. Baron Nordenskiöld has sent them a Chukche vocabulary, and Prince Bismarck has furnished them with letters of recommendation to the German representatives in the United States.—Herr G. Albrecht was elected President of the Society, and Dr. Lindemann succeeds him in the office he previously held.

Imperial Geographical Society of St. Petersburg.—January 27th, 1881: Special meeting for the reception of Colonel Prejevalsky.—Among those present at the meeting were M. de Giers, Minister for Foreign Affairs, Vice-Admiral Possiett, many members of the Council of the Empire, numerous officers, representatives of science, &c. His Imperial Highness the Grand Duke Constantine Nicolaievich, President of the Society, having introduced Colonel Prejevalsky to the audience amidst enthusiastic applause, the Vice-President, M. Semenof, gave a brief account of the services which the gallant explorer had rendered to science, and made the formal announcement of the election of Colonel Prejevalsky as an honorary member of the Society. M. M. Semefsky, delegate of the Municipal Council of St. Petersburg, which had been specially invited to be present on the occasion, next informed the Meeting that the honorary freedom of the city had been conferred upon him; both these statements being received with loud applause.—Colonel Prejevalsky then rose and addressed the Meeting on the subject of his journey in Central Asia, an account of which we have already given our readers from the traveller's own letters.

——— February 9th, 1881: Annual General Meeting.—The Society proceeded to the election of its officers for the next four years, when M. P. Semenof was re-elected Vice-President, and Baron F. Osten Sacken Assistant Vice-President.—His Imperial Highness Prince Kita Shirakawa-no-Miya, President of the Geographical Society of Tokio, Japan, and Baron A. E. Nordenskiöld, were elected honorary members of the Society.

——— March 22nd, 1881.—M. Regel, the well-known botanist, gave an account of his journey from Kuldja to Turfan in 1879.*

——— April 13th, 1881: M. SEMENOF, Vice-President, in the Chair.—After an allusion by the Chairman to the recent murder of the Emperor, and the great interest which his Majesty always took in all the scientific expeditions despatched by the Society, the Secretary, M. V. J. de Sreznefsky, read a report, in the course of which he referred to M. Regel's journey in Southern Ferghana and M. Ravinsky's ethnographical researches in Bulgaria; he then informed the Meeting of the most recent arrangements made for the organisation of Polar stations, and of the part which the Society proposed to take in the International Geographical Congress and Exhibition at Venice.—M. Yadrintsef afterwards made a communication on his journey last year to the Altai range, among the results of which are a detailed survey of his routes, determinations of heights, anthropological data respecting the tribes visited, &c.

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* A translation of this is given in the present number, p. 340 *et seq.*

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Freeman, E. A.—The Historical Geography of Europe. London (Longmans, Green, & Co.): 1881, 2 vols., 8vo. (Vol. I. pp. xlix. & 604; Vol. II., Maps). Price 1*l.* 11*s.* 6*d.*

The author aims at little more than tracing out the extent of various states at different times and at attempting to place the various changes in their due relation to one another and to their causes,—events being looked at mainly with reference to their effect on the European map. The sixty-five maps are intended simply to illustrate the text, giving changes of boundary in a general way. Starting with Homeric Greece, they represent the various political conditions of the chief kingdoms of Europe at various epochs, in some cases reaching to 1871.

AFRICA.

Chavanne, Josef.—Afrika im Lichte unserer Tage. Bodengestalt und geologischer Bau. Wien, Pest, Leipzig (Hartleben): 1881, cr. 8vo., pp. 181, map. Price 3*s.*

A general sketch of the relief and geology of Africa, divided under Atlas system, Sahara, Sudan plateau, and Central and South highlands, and illustrated by a coloured hypsometrical map (scale 1 : 30,000,000).

Thomson, Joseph.—To the Central African Lakes and back: the Narrative of the Royal Geographical Society's East Central African Expedition, 1878–80. With a short biographical notice of the late Mr. Keith Johnston. London (Sampson Low & Co.): 1881, 2 vols., cr. 8vo., pp. xxiv., 320, and 323, portraits, maps. Price 1*l.* 4*s.*

Although not published or supported by the Royal Geographical Society (as might be wrongly inferred from the volumes being endorsed with its well-known device, for which the binders had no official or other authority), this work is so essentially connected with the Society that its outline must be already familiar to readers of our 'Proceedings.' Nevertheless the details of the daily work from Dar-es-Salaam to Nyassa and Tanganyika, and of the subsequent journeys to the Lukuga and Urua, along the eastern coast of Tanganyika, to Lake Hikwa and Unyanyembe, will be found of great interest to geographers. The earlier proceedings of the expedition, including the preliminary excursion to Usambara, have been narrated by the original leader, the lamented Keith Johnston, of whose life and labours a fitting notice (under the initials of our Assistant-Secretary) is given at the commencement of the first volume of Mr. Thomson's work, together with a portrait from a photograph. Among the notes referring to this part of the journey, however, there is one of some economic importance, based upon Dr. Robb's observations, as to the great change which has taken place recently in the climate of Zanzibar. The noxious malaria and extreme general unhealthiness attributed to it by former travellers have now practically disappeared; the rainfall has apparently diminished by more than one-half since Captain Burton's visit in 1857; and the altered conditions of life effected mainly by the enlightened views of the Sultan and the energy of Dr.

Kirk, have freed this important station from the charge of unsuitability for Europeans.

Pongwe, the first halting-place after leaving Dr. Kirk at Dar-es-Salaam on 19th May, 1879, is described as the last village inhabited by Swahili, for whom the author claims an ethnologically distinct tribal rank, repudiating the hitherto accepted opinion that they are a hybrid race, the descendants of Arabs and various native peoples. The country here is a plain stretching some 30 miles into the interior, entirely submerged in the winter, except the ridges, and scorched up in the dry season. It is apparently a succession of two if not three raised beaches, caused by geologically recent but separate upheavals of ocean bed; former deep channels in the coral reefs being thus converted into harbours, and surface reef depressions becoming ponds on the inland plain. The lowest beach rises from 20 feet along the sea-line to 60 feet inland, with a general upward slope, and they all consist of coral rock, detritus, and sand. At Mkamba, 35 miles from the coast, a fertile region was reached, and it was here, in the attempt to stalk hippopotamus in a marsh, that Johnston contracted the dysentery of which he died. In discussing the difficulties of carrying an invalid, Mr. Thomson here emphatically condemns the use of donkeys in an East African caravan, either for transport or riding.

The country between Mkamba and Behobeho, in the drainage basin of the Rufiji (which was at Kimkumbi half a mile wide, broken up by sandy islands and sedgy tracts, and evidently of very difficult navigation even by small boats), was found to be level, devoid of watercourses, and unpromising in appearance. Its inhabitants the Wazaramo seem to have passed through a great moral and social revolution since Burton's time. Behobeho itself is in the heart of the dense forest of the mountains flanking the great central plateau of Inner Africa, and the monumental mountain S.S.W. of it, called Mkulimahatambula by the natives, is renamed Mount Johnston by the author, in memory of his chief, who died there.

Left to his own resources, Mr. Thomson took the circuitous route through Khutu, on account of its affording more food, and was soon met by the dreaded Mahenge, who, however, did not prove hostile to white men. The Wakhutu were found as degraded as in Burton's time, though they have improved in material comforts; they have no common union for protection. Zungomero, now known as Kisake, is no longer their chief place of note, being supplanted by Mgunda (formerly Mbwiga), which owes its prosperity to Wanyamwesi settlers.

Four days S.S.E. from Mgunda, after passing the Wamahala, Walugulu, and Wangwila tribes, whose peculiarities are noted, the Ruaha was reached,—the first time that its lower portion had ever been visited by any European traveller. Its rapids, stony barriers, and narrow and shallow current, render this river unfit for navigation. The Mahenge, whose country it limits, were physically and mentally far superior to the Wakhutu, and their domestic economy and political status are described at some length; they probably only number about 4000, and have acquired a fictitious importance from assuming the dress and arms of the more warlike Maviti. The Uranga affluent of the Rufiji, never before seen by white man, was found to be full of hippopotami, and very deep. Long mountain marches, during which various small northern tributaries of this river were crossed, brought the party by a pass of 7000 feet high to Uhehe on the plateau of Inner Africa, from 4000 feet to 5000 feet high. A bleak and barren prospect met the traveller's eye; nothing was seen but monotonous smooth ridges, with shallow valleys. Animal life was scanty in this bleak region, though strangely enough there was a richer flora than in the lowlands. A detention at Uhenge in Ubena by the chief Mamle gives Mr. Thomson occasion for a history of the Wahehe, who under Machinga had overrun Urori until beaten back from Merere's final stronghold during Captain Elton's visit. Mamle, who murdered Machinga, renewed the attack and subsequently defeated Merere, but was in turn driven out by him with the assistance of Machinga's son, after Mr. Thomson had left the district.

A curious region is described, after passing Mamle's town Mkubwasanya: the soil is a pink clay cut into narrow gullies 50 or 60 feet deep, the intervening spaces forming mud pillars, rocking stones, and colossal blocks, scattered in chaotic confusion, not the result of upheaval but of erosion.

Leaving Uhenge, and following up the course of the Mbangala—a tributary of the Ruaha, flowing at the base of an extremely precipitous mountain, some 4000 feet above the plateau—a hill tribe called Wapangwa were found to exhibit the peculiarity of squinting in the majority, a large number having also the left eye-ball destroyed. Another small tribe, the Wanena, of still lower type, near the three streams forming the head-waters of the Ruaha, cause the observation that in Africa mountain tribes exhibit the anomaly of degradation, being most likely primitive races broken up and driven into fastnesses by more powerful invaders.

Crossing the watershed of the Ruaha and Nyassa basins, Mr. Thomson reached the place where the Konde range should be; coming to the conclusion that it has no existence, but is represented by the escarpment of the plateau, 6000 to 8000 feet high, encircling the north end of Nyassa, where the metamorphic rocks become volcanic. Arriving safely at the lake at its most northern extremity, some rest was taken in Makula's country, a perfect Arcadia of cultivation and comfort. The people are not Wachungu, but emigrated Wakinga.

Starting again for Tanganyika on 29th September, extinct but perfectly formed volcanic craters were seen, with a circular lake, apparently of similar origin; and after passing through the cowardly Wakukwe, the country of the haughty and warlike Wanyika was reached. These are unmatched for boldness and cool impudence in East Central Africa, and, but for want of union, would be very important. Food was scarce, but honey was to be had in extraordinary abundance, and the young bees were devoured with avidity. Ascending the Munboya mountains, 8200 feet high, the greatest altitude of the journey, the western limits of the Wanyika were reached at Mtinga, the people gradually becoming more pastoral and improved in appearance; and the expedition entered Inyamwanga after crossing the Chingambo spur. Next came Mambwe's territory, doubtless a stagnant lake in the wet season, and which contains bog iron, smelted and worked by natives, Mr. Thomson thinks that this general form of distribution in nodules of the metal has given rise to the accounts of the fabulous mineral wealth of the country. The trade route was struck at Ulungu, and vol. i. closes with the safe arrival at the south end of Tanganyika.

Having fallen in with Mr. Stewart at Pambete, the author met with his first slave caravan on his road to Iendwe, where he left the bulk of his goods and men under the charge of Chuma. The journey to the Lukuga along the western coast of Tanganyika then commenced, by Itawa and Marungu, across precipitous ridges and through gloomy ravines, rendered more trying by the rainy season swelling the mountain torrents. The Marungu natives are noted as being of extraordinary excitability, and much subject to goître. The Tchansa mountains form their northern boundary, beyond which is the country of the peaceful Waguha, in which the higher altitudes of the plateau recede from the lake, assuming the form of low hills, from four to eight miles inland. Passing through Tembwe, the Lukuga came in sight, unusually free for an African river, sweeping along in a deep channel between clean-cut banks. Mr. Thomson enters at some length into the history of this now celebrated outlet, without, however, adding much to our knowledge of it, and practically verifying Cameron's statements and opinions, though giving more importance to those of Stanley, who simply saw the river when the waters were higher. He finds no geological evidence to support Stanley's theory as to the formation of the lake at two distinct periods; and he was unable to find more than eight rivers flowing into its southern half (all very small, except the Malagarazi, even in the rainy season), out of the ninety-six referred to by Cameron. The Arabs at Mtowa informed him that the first outburst of the Lukuga produced a great flood in the Congo, sweeping away villages and drowning their inhabitants.

After a boat excursion down the river, the author struck across to Ruanda and Mtowa, where he met Messrs. Griffiths and Hutley of the London Missionary Society, and Père Denaud of the French Catholic Mission. Thence he crossed to Ujiji, where he found Mr. Hore; and though disappointed in the market, was struck with the stir and business of the place. Returning to

Mtowa, the volume of water was found to have considerably diminished, a sandbar being visible. Mr. Thomson then commenced his attempt to pass down the Lukuga to the Congo, but at Makalumbi found the river trending to the northwest, and was met with decided refusal on the part of his men to go any nearer the dreaded Manyema. A compromise was, however, effected by the agreement to strike south-west through Urua to the Lualaba; but on arriving at Makiyombo, within one day's march, after many difficulties, this also had to be abandoned, and he returned by the same rôute to Mtowa, having been badly treated by the Warua. Thence he sailed with Mr. Hore along the eastern coast of the lake to Iendwe, having visited the late Captain Carter at Karema. His strictures upon the utter want of practical utility in this station (which was apparently founded on a mistake of Stanley's, who meant Massi-Kamba by his description), and upon other matters connected with the Belgian and French expeditions, however interesting, cannot be detailed here.

The resumption of the war between Mamle and Merere prevented the return journey to the coast being made east by the Rufiji valley; and on 13th April, 1879, the route along the east coast of Tanganyika for Unyanyembe was taken. From Makapufi, the author visited Lake Hikwa or Likwa, which is surrounded by almost sheer precipices, 4000 to 5000 feet above the water, and with no known or probable outlet. Mr. Thomson thinks it to be slightly below the level of Tanganyika: he enumerates its varying names, and proposes to call it Lake Leopold.

Resuming the march to Unyanyembe along the lofty undulating plateau, a sudden descent of 1500 feet past Kwamanda brought the party into the immense plain through which the Mkafu sluggishly flows; and after crossing this and its tributaries Simba's town was visited. Being now on the known path, various Europeans were met, including Mr. Cadenhead (who was shortly afterwards killed, with Captain Carter) and MM. Roger and Burdo; and the remaining journey to Kwihalah and Taborah, and through Ugogo and Usagara to Bagamoyo, requires no further extract.

Omitting the author's deductions as to missionary and civilising expeditions, his opinion should be recorded, as based upon actual observation, that there is no article save ivory which it would pay to bring down from the interior. He thinks the amount of iron existing in East Central Africa has hitherto been grossly exaggerated, and he saw no single mineral in a form which a European would attempt to work as a profitable or reasonable speculation. He saw no coal, or geological evidence of it. As to ivory, he never once saw an elephant. Roads therefore would apparently be useless from a commercial point of view, however much they may contribute to development of civilisation.

In an Appendix, Mr. Thomson's plants are briefly noted by Mr. J. G. Baker; amongst widely spread tropical and sub-temperate genera, they contain a considerable number of characteristically Cape types. Mr. Edgar A. Smith of the British Museum remarks upon the shells collected, those from Tanganyika quite bearing out the conclusion that the lake was formerly an inland sea, whose waters have gradually freshened, many of the species having all the appearance of modified marine forms. Nyassa has apparently no connection with the formation of this lake, as it presents a quite distinct conchological fauna.

Mr. Thomson also gives some separate notes on the Geology of East Central Africa, upon which he says no attempt as yet has been made to throw any accurate or reliable light. The account by Alexander Sadebeck in vol. iii. of Von der Decken's 'Reisen in Ost-Afrika,' published at Leipzig in 1879 and referred to in our 'Proceedings' for that year (p. 741), would thus appear either to have escaped him or to be of insignificant authority. This contains forty pages of recapitulation and analysis of former references to the geology of East Africa, and a map (scale 116 miles to the inch) including from Khartum to the Zambesi delta and from the coast to the Lualaba, and giving coloured representations of such formations as were then known. Mr. Thomson's map (scale 43 miles to the inch) of course only includes the much more limited area of his own journey, and therefore contains additional detail as well as new matter. The coast tertiary deposits above noticed are succeeded near the base of the inner plateau by sandstones and carboniferous rocks striking north and south, never rising over 1000 feet, and suggesting a continental outline unaltered from an anterior period. An immense series of greatly more ancient metamorphic rocks composes the escarpment of the plateau, after which a granitic district (sometimes decomposed and forming thick accumulations of clay) is reached, showing evidence of volcanic eruptions, which extended from the Cape to Abyssinia parallel to and near the coast. The upper plateau is also metamorphic, clay-slates occurring near Nyassa, round which is an extraordinary agglomeration of volcanic rocks, probably resulting from one slowly acting crater. No sufficient material is given for any broad sketch of the country between Nyassa and Tanganyika. The latter lake is set as it were in a socket of sandstone, which ends abruptly with the descent from the plateau, being succeeded by a great mass of felspathic rock forced through the crust of the earth previous to the formation of the present lake, and subsequently fractured into halves. The beds on the eastern side of the lake seem not to have been much disturbed, and in Mr. Thomson's opinion were formed by a great inland sea-basin, which included the whole Congo region from Tanganyika to the West Coast mountains, the lake forming a bottom hollow, remaining salt on the upheaval of the continent. This basin disappeared through the channel cut by the great western outlet of the Congo, or by the more speedy fracture of the Zambesi.

A table of altitudes between Pongwe and Makalumbi, computed by Lieutenant Sugden, completes the work, which, besides the map and photograph above referred to, is illustrated by a photograph of the author, and a route map on the same scale as the geological one (both of which contain sections).

Vigoni, Pippo.—Abissinia. Giornale di un Viaggio. Milano (Hoepli): 1881, 8vo., pp. 246, map, views, &c. (*Dulau:* price 7*s.*)

Signor Vigoni accompanied Captain Erba in a commercial expedition to Abyssinia at the end of 1878. His route was from Massowa (after a short excursion to Keren in Bogos) to Adowa by Asmara, thence, after visiting Axum, to Gondar and Lake Tsana, getting as far south as Agitto in the Amhara country, and returning by a slightly different road to Massowa. Some boldly executed lithographic drawings of various localities, ecclesiastical ornaments, &c., a portrait of King John with facsimile letter, and map (by Professor Dalla Vedova, scale, 1 : 3,750,000) illustrate the narrative.

AMERICA.

Bárcena, Mariano.—Descripcion de la Ciudad del Guadalajara, Capital del Estado de Jalisco. México (F. Diaz de Leon): 1880, 8vo., pp. 123, tables, plan, and plate.

This account forms a supplement to the description of the second Exposition promoted by the Society of "Clases Productoras" in Guadalajara, and contains an historical summary of the foundation and progress of that city, descriptions of its ancient and modern conditions and geographical position, accounts of the geological formation of its district and its climate, a plan and view of the city, with notices of its chief architectural and other features and public works, and various educational, commercial, industrial, and statistical particulars.

Canada.—Report of the Surveyor-General of Dominion Lands for the year 1880. Department of the Interior, Dominion Lands Office, Ottawa [1881]: 8vo., pp. 78.

Mr. Lindsay Russell here gives a summary of the official work referring to settlement, land-grants, and surveys. As in every former year, the past season's operations have afforded information of large additional areas to the known quantity of lands best available for immigrants. The whole of the region surveyed in the Souris and Turtle mountain districts south of the Assinniboine and Qu'appelle rivers, as far west as the so-called Missouri Coteau, 105° W. long., is considered to afford first-class land for settlement. Though not so well wooded as the districts on the north side of the rivers above named, it is by no means a treeless prairie,—more or less wood being met with on the banks of every creek, and a large quantity of timber found on the Moose Mountains range. Favourable reports have also been received from the surveyors of the district north of the Qu'appelle, and between the Assinniboine and the Touchwood Hills; and it is especially noted that lignite from the deposits of the upper waters of the Souris has actually reached the Winnipeg markets.

The establishment of a 6th principal meridian (114° W. long.) has been furthered by carrying the special survey for 350 miles from Edmonton southward to the boundary line at a point south of Fort Macleod. Incidentally, the returns of this operation indicate a tract of country specially adapted in every way for settlement, along the eastern slope of the Rocky Mountains between the upper waters of the Bow River and Edmonton, and on the Red Deer River.

An extract from a Report of exploration by Professor Macoun is appended, descriptive of the portion of the Souris Valley within British territory, and of the adjoining region to the west and north. Special attention is paid in this to the Ornithology and Botany of the region traversed, carefully named lists of birds and plants being given, and the peculiarities of distribution of the latter noticed.

Extracts from less important Reports of Surveys, chiefly referring to the nature of soil, grazing capabilities, and timber, are also given, with a list of positions between Fort MacLeod and the 102nd meridian, determined by astronomical observation, route distances, &c.

Oswald, F. L.—Streifzüge in den Urwäldern von Mexico und Central-Amerika. Leipzig (Brockhaus): 1881, 8vo., pp. 384, woodcuts. (*Williams & Norgate:* price 7*s.* 6*d.*)

The author, now resident in Cincinnati, went to Veracruz in the winter of 1867 as Director of the Belgian Military Hospital, and since that time has visited parts of the Central American Highlands. In this well-illustrated volume, he details his experiences in Sonora, Colima, the mountain lake district of Jalisco, the Western Cordilleras, the Sierra Madre, Tierra Fria, the Oaxaca valley, the delta of the Usumacinta, Yucatan, the mountain forests of Guatemala, and the Sierra Negra.

AUSTRALASIA.

Gordon Cumming, C. F.—At Home in Fiji. Edinburgh and London (Blackwood), 1881, 2 vols. crown 8vo., pp. 293 and 324, map, illustrations. Price 25*s.*

A narrative of personal experiences during a residence in the islands in 1875 and 1876, including also a visit to New Zealand.

ARCTIC.

Klutschak, H. W.—Als Eskimo unter den Eskimos. Eine Schilderung der Erlebnisse der Schwatka'schen Franklin-Aufsuchungs-Expedition in den Jahren 1878–80. Wien, Pest, Leipzig (Hartleben): 1881, 8vo., pp. 247, maps, plates, woodcuts. Price 6*s.*

A well-illustrated account of Lieutenant Schwatka's expedition in search of relics of Franklin, of which the particulars have been given in our 'Proceedings.'

INSTRUCTIVE.

Issel, Arturo.—Istruzioni scientifiche pei Viaggiatori, raccolte da Arturo Issel, in collaborazione dei Signori Giovanni Celoria, Michele Stefano de Rossi, Raffaello Gestro, Enrico Giglioli, Guido Grassi, Angiolo Manzoni, Antonio Piccone, Gustavo Uzielli, e Arturo Zannetti. Roma (Minestero di Agricoltura, Industria e Commercio): 1881, crown 8vo., pp. xii., 556.

General scientific instructions for Italian travellers, on the scheme of Herschel's 'Manual of Scientific Inquiry,' or perhaps rather of Neumayer's well-known work. Astronomy, Meteorology, Geography and Topography, Deep Sea Exploration, Geology and Palæontology, Anthropology and Ethnology, Zoology, Botany, and Mineralogy are in turn discussed; and the work is apparently based on articles originally appearing in the 'Rivista marittima.'

Kollbrunner, E.—Der Beobachter. Allgemeine Anleitung zu Beobachtungen über Land und Leute, für Touristen, Excursionisten, und Forschungsreisende. Zürich (Wurster): 1881, 8vo., maps, pls. (*Dulau.*)

A German translation and adaptation of Kaltbrunner's 'Manuel du Voyageur,' to be published in numbers (price 1*s.* 3*d.*).

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

WORLD.

Bartholomew, J.—Library Chart of the World on Mercator's Projection. Equatorial Scale 5¾° to an inch. Published by G. Philip & Son, London, 1881. Price 3*l.* 3*s.*

This is an entirely new map, brought so nearly up to date that it shows the late discoveries of Mr. Leigh Smith in Franz-Josef Land. Numerous tracks of vessels between all the principal ports of the world, with the distance in miles and duration of the passage in days, are laid down; all submarine telegraphs, together with the dates when the cables were laid, and such matters of interest as the voyages of the *Challenger*, *Tuscarora*, and *Vega* are given, with all the deep-sea soundings taken by the two former vessels. The general ocean depths from 100 to 880 fathoms are indicated by different shades of blue, and the main ocean currents, and limits of ice drift are clearly shown. In addition to the above, there are five different inset maps, which deal more particularly with the information contained in the larger map, as, for instance, the projection of the sphere on the plane of the equator, thus showing the proportions of land and water in the northern and southern hemispheres; a map illustrating the natural productions of the world in different lands, and the principal ports of maritime commerce; a table containing the populations of all the principal ports of Europe, Asia, Africa, America, and Australia; a chart showing the elevations and depressions of the world; and a physical map of the world illustrating the winds of different regions, with the principal hydrographic basins of either continent.

This map can be obtained of the publishers in sheets, in the form of an atlas.

Hector, Thomas.—Ellipto-Polar Map of the World, by Thomas Hector, Ottawa.

This map is a projection of the globe from its South Pole upon the interior of an oblate spheroidal hemisphere, and thence orthographically down upon the plane of the transverse diameter forming its base. The oblate spheroidal hemisphere being generated by the revolution round its conjugate axis of an ellipse of which the distance of its foci from the centre of its transverse axis is equal to the chord of 90°, and its conjugate axis is twice the Polar axis of the globe; the relation between the sphere projected and the oblate hemisphere being of course similar in nature (though differing in degree) to that between a true sphere and the oblate spheroidal form of the earth.

North of the Equator, this map is similar in character to a globular projection. South of the Equator, there is necessarily greatly increasing distortion.

A diagram illustrating the projection is given with the map.

Petermann's 'Geographische Mittheilungen.'—Kartenskizze der Geographischen Verbreitung der Dattelpalme von Theobald Fischer. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 64. Justus Perthes, Gotha, 1881. (*Dulau.*)

EUROPE.

Algermissen, J. L.—Topographische Special-Karte der Umgegend von Köln. Scale 1:50,000 or 1·4 inch to a geographical mile. Mit Niveaulinien. Warnitz & Co., Köln. Price 3*s.* (*Dulau.*)

Allodi, P.—Pianta di Milano, colla pianta del Palazzo della Esposizione Nazionale. Milano. Price 1*s.* (*Dulau.*)

Brine, Col. Frederic, R.E.—Tourist's Map of Iceland. Scale 1 : 2,050,000 or 28 geographical miles to an inch. By Col. Frederic Brine, R.E. E. Stanford, London, 1881. Price 3*s.* 6*d.*

Dépôt de la Guerre.—Carte de la frontière des Alpes. Scale 1 : 320,000 or 4·3 geographical miles to an inch. Feuille 6. Briançon. Dépôt de la Guerre, Paris. Price 1*s.* 6*d.* (*Dulau.*)

Kiepert, H.—Cartes des nouvelles frontières entre la Serbie, la Roumanie, la Bulgarie, la Roumélie orientale et les provinces immédiates de la Turquie selon les décisions du Congrès de Berlin. 4 sheets. Scale 1 : 300,000 or 4·1 geographical miles to an inch. D. Reimer, Berlin, 1881. Price 4*s.* (*Dulau.*)

These maps are published in a very convenient form for reference, and being photozincographs of the original surveys of the Commission of 1879, can hardly fail to be useful to those who are interested in Eastern affairs.

Mach, Gottfried, & Maasburg, Ludwig Freiherrn v.—Eisenbahn-, Dampfschiff- und Telegrafen-Verkehrs-Karte der österreich-ungarischen Monarchie mit Angabe der Cur- und Badeorte. Zusammengestellt und gezeichnet von Gottfried Mach & Ludwig Freiherrn v. Maasburg. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Vienna, 1881. Price 7*s.* 6*d.* (*Stanford.*)

Petermann's 'Geographische Mittheilungen.'—Übersicht der neuen Französischen Landesbefestigung. Zusammengestellt auf C. Vogel's Karte von Frankreich in 4 Bl. Scale 1:500,000 or 6·8 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881, Tafel 7. Justus Perthes, Gotha. (*Dulau.*)

ORDNANCE SURVEY MAPS.

1-inch—General Maps:—

England and Wales: Nos. 303, 332, and 333 at 1*s.* New Series.

Scotland: No. 53 with hills, and No. 93 outline, at 1*s.* 9*d.*

Ireland: No. 115 with hills, at 1*s.*

6-inch—County Maps:—

Scotland: Argyllshire: Coll Isle, No. 21 at 2*s.* Inverness-shire: Hebrides, Barra, &c., No. 65 at 2*s.*; Uist, North, No. 32 at 2*s.* 6*d.*, and No. 36 at 2*s.*, Uist, South. Orkney and Shetland: Shetland, No. 54 at 2*s.* 6*d.*

Ireland: Cavan, No. 23 (revised) at 2*s.* 6*d.*

25-inch—Parish Maps:—

England: **Bucks**: Dunton, 5 sheets at 2*s.* 6*d.*, Area Book 1*s.*; Edgcott, 3 sheets at 2*s.* 6*d.*, 2 at 3*s.*, Area Book 1*s.*; Grendon Underwood, 6 sheets at 2*s.* 6*d.*, 3 at 3*s.*, Area Book 1*s.*; Hillesden, 8 sheets at 2*s.* 6*d.*, Area Book 1*s.*; Hoggeston, 6 sheets at 2*s.* 6*d.*, 1 at 3*s.* 6*d.*, Area Book 1*s.*; Ludgershall and Brill, detached, 4 sheets at 2*s.* 6*d.*, 1 at 3*s.* 6*d.*, 1 at 4*s.*, Area Book 1*s.*; Marsh Gibbon, in part, 6 sheets at 2*s.* 6*d.*, 1 at 3*s.*, 1 at 3*s.* 6*d.*, Area Book 1*s.*; Preston Bissett, 4 sheets at 2*s.* 6*d.*, 1 at 3*s.* 6*d.*, 1 at 4*s.*, Area Book 1*s.*; Quainton and Hogshaw, detached, 10 sheets at 2*s.* 6*d.*, 2 at 3*s.* 6*d.*, Area Book 1*s.*; Swanbourne, 7 sheets at 2*s.* 6*d.*, 2 at 3*s.* 6*d.*, Area Book 1*s.*; Waddesdon, 16 sheets at 2*s.* 6*d.*, 2 at 3*s.*, 2 at 3*s.* 6*d.*, Area Book 1*s.*

Cornwall: Cubert, 7 sheets at 2*s.* 6*d.*, 1 at 3*s.*, Area Book 1*s.*; Crantock, 5 sheets at 2*s.* 6*d.*, 2 at 3*s.*, 1 at 4*s.*, Area Book 1*s.*; Colan, 4 sheets at 2*s.* 6*d.*, 2 at 3*s.*, 1 at 3*s.* 6*d.*, Area Book 1*s.*; Ladock, in completion, 2 sheets at 2*s.* 6*d.*, 1 at 3*s.*; Newlyn, in completion, 5 sheets at 2*s.* 6*d.*, 1 at 3*s.*; St. Columb Minor, 12 sheets at 2*s.* 6*d.*, 4 at 3*s.*, 1 at 3*s.* 6*d.*, 1 at 4*s.*; St. Enoder, in completion, 5 sheets at 2*s.* 6*d.*, 3 at 3*s.* **Derby**: Bradley, 7 sheets at 2*s.* 6*d.*, 1 at 5*s.*, Area Book 1*s.*; Bradbourne, and ditto detached, in completion, 2 sheets at 2*s.* 6*d.*; Glossop, in completion, 1 sheet at 2*s.* 6*d.*, 1 at 4*s.*, 1 at 7*s.* 6*d.*; Hognaston, 8 sheets at 2*s.* 6*d.*, Area Book 1*s.*; Kirk Ireton and Ashbourne, detached, 1 sheet, in completion, at 2*s.* 6*d.*; Peak Forest township, in completion, 6 sheets at 2*s.* 6*d.*; Tideswell, in completion, 3 sheets at 2*s.* 6*d.*, 2 at 3*s.*; Wirksworth, and ditto detached, in completion, 3 sheets at 2*s.* 6*d.*, 1 at 3*s.*, 1 at 4*s.* **Herts**: Weston, in part, 9 sheets at 2*s.* 6*d.*, 1 at 4*s.* **Oxon**: Bladon, in completion, 1 sheet at 2*s.* 6*d.*, 1 at 3*s.*; Blenheim Park, in completion, 3 sheets at 2*s.* 6*d.*; Clanfield, in completion, 2 sheets at 2*s.* 6*d.*, 1 at 3*s.* 6*d.*; Stonesfield, 4 sheets at 2*s.* 6*d.*, Area Book 1*s.*; Wilcote, 2 sheets at 2*s.* 6*d.*, 1 at 3*s.*, Area Book 1*s.* **Wilts**: Burcombe, detached, 1 sheet at 4*s.*, 1 at 5*s.*, Area Book 1*s.*; Alderbury, in completion, 2 sheets at 2*s.* 6*d.*; West Grimstead, 6 sheets at 2*s.* 6*d.*, Area Book 1*s.*; West Dean, and ditto detached, 3 sheets at 2*s.* 6*d.*; Winterbourne Dauntsey, in completion, 2 sheets at 2*s.* 6*d.*; Winterbourne Earls, 8 sheets at 2*s.* 6*d.*, Area Book 1*s.*; Whiteparish, and ditto detached, 2 sheets at 2*s.* 6*d.*

Town Plans: 10-feet scale:—

Luton, in completion, 7 sheets at 2*s.* 6*d.*
Salisbury, in part, 13 sheets at 2*s.* 6*d.*
(*Stanford, agent.*)

ASIA.

Indian Government Surveys:—

Indian Atlas, Quarter Sheets Nos. 34. N.W., 52. S.W., 72. N.W., 91. N.W., 92. S.W., 125. N.W., and 130. N.W.—Punjab Survey. District Bannu. Scale 1 mile to an inch. Sheets Nos. 1, 2, and 8. District Dera Ismail Khan. Scale 1 mile to an inch. Sheets Nos. 12 and 24.—Punjab Revenue Survey. Sakesar Sanitarium. Bannu and Shahpur. Surveyed season 1878–79. Scale 16 inches to 1 mile.—Oudh Revenue Survey. District Bahraich. Scale 1 mile to an inch. Sheet No. 144.—Ganjam and Orissa Topographical Survey. Seasons 1864–65 and 67–68. Scale 2 miles to an inch. Sheets Nos. 88, 89, 90 and 91 (Old Series). Parts of Districts Raipur and Bilaspur; also of District Sambalpur and the Garhjat States of Phuljhar and Sarangarh, Central Provinces.—Hyderabad Topographical Survey. Scale 1 mile to an inch. Season 1865–66. Sheets Nos. 16 and 18, Parts of Rakapali Taluk, Godavari District (Madras Presidency).—Khandesh and Bombay Native States Topographical Survey. Scale 1 mile to an inch. Seasons 1877–78–79. Sheet No. 32, Part of Khandesh.—Lower Provinces Survey. District Midnapore. Scale 1 mile to an inch. Sheets Nos. 13 and 16.—Lower Provinces Revenue Survey. District Maldah. Scale 1 mile to an inch. Sheet No. 6.—Lower Provinces, Bengal. District Rungpore, 1855–58 and 1874–75. Scale 4 miles to an inch. District Mymensingh, 1852–57. Scale 4 miles to an inch.—North-West Provinces Survey. District Muttra. Surveyed in seasons 1871–74. Scale 1 mile to an inch. Sheets Nos. 10, 11, 12, and 22.—Trigonometrical Branch, Survey of India. Scale 1 mile to an inch. Sheet No. 26 of Guzerat. Parts of the Ahmedabad, Kaira and Panch Mahals Districts, of the Gaikwar's Territory, and of the Mahi Kanta and Rewa Kanta States.—Trigonometrical Branch, Survey of India. Scale 1 mile to an inch. Sheet No. 39 of Kattywar (The Gir). Parts of Kattywar and Sorath.—Khasi and Garo Hills Topographical Survey. Scale 2 miles to an inch. Sheet No. 23 (second edition).

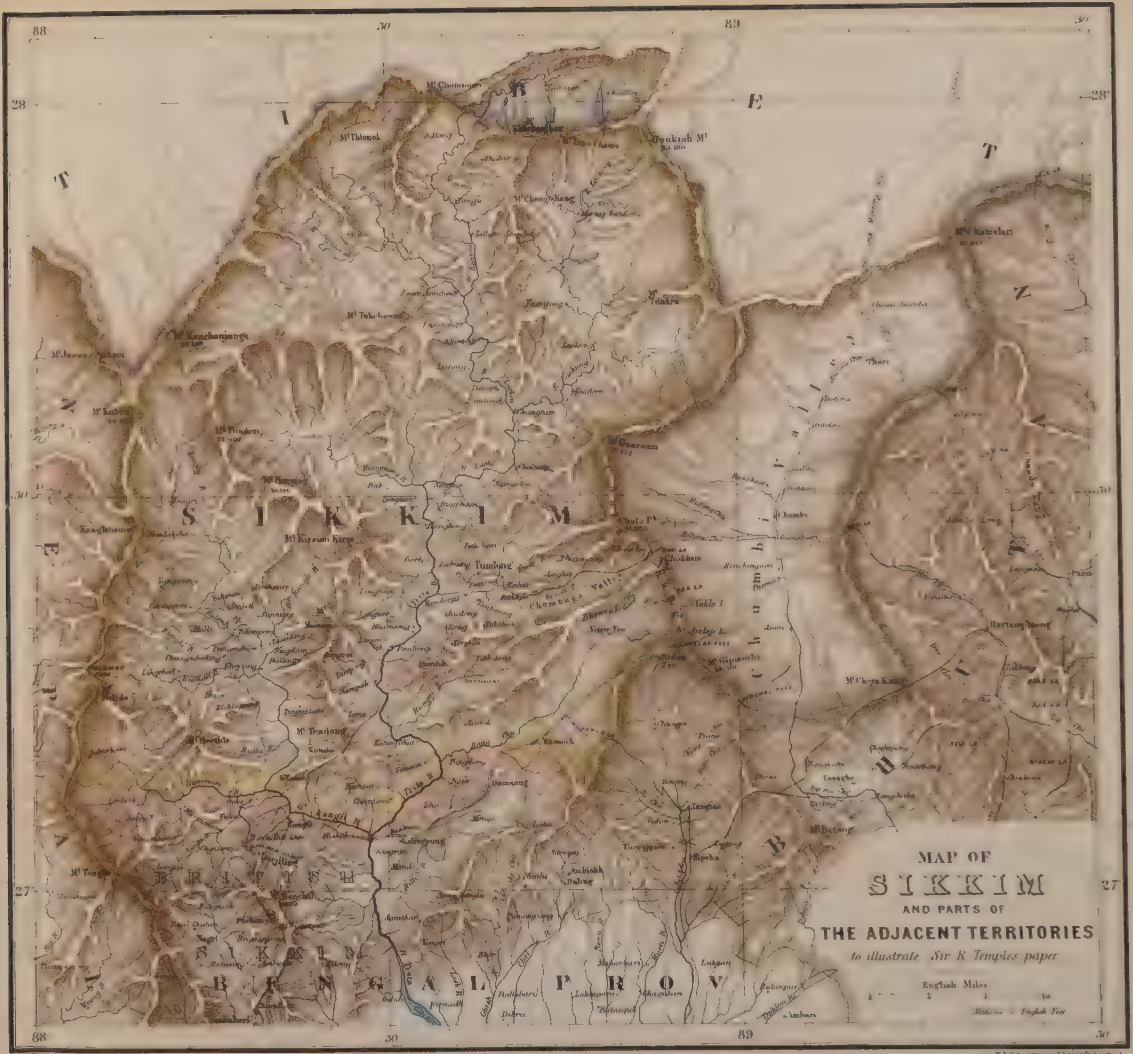
Portion of Jaintia Hills. Season 1867–68.—Map of the town of Akyab. Surveyed under the superintendence of Mr. Henry L. Pemberton, late Revenue Survey of India, in season 1877–78. Scale 400 feet to an inch.—Map of the Town of Moulmein. Surveyed under the superintendence of Mr. Henry L. Pemberton, late Revenue Survey of India, in season 1876–77. Scale 400 feet to an inch.—Cantonments of Moulmein. Surveyed under the superintendence of Mr. Henry L. Pemberton, late Survey of India, in season 1876–77. Scale 200 feet to an inch.—North-West Frontier of India. Trigonometrical Branch Survey of India. Preliminary Chart of the Kelat Series. Season 1879–80. Scale 4 miles to an inch. Preliminary Chart of the Kandahar Series. Season 1878–79. Scale 4 miles to an inch.—Seat of War in Northern Afghanistan. Taken principally from Surveys and Reconnaissances by Officers of the Survey of India. 1878–79–80. Scale 4 miles to an inch (third edition).—Thal Chotiali Route Survey. Sheet 1, with Pishin and Toba, the Kakar Country and Kadanai River. Scale 4 miles to an inch. Surveyed 1879 by Captains W. J. Heaviside, R.E., T. H. Holdich, R.E., and Lieutenant St. George Gore, R.E.—Thal Chotiali Route Survey. Sheet 2, from the Kakar Country to the Suliman Range. Surveyed 1879 by Captains W. J. Heaviside, R.E., and T. H. Holdich, R.E.—Part of road from Kandahar to Kabul, i. e. from near Shahjui to the Logar River, finally adjusted and redrawn from the original sketches made by Lieutenant Gore, R.E., in 1880. Scale 4 miles to an inch Reconnaissance of the Tarnak and Khushk-i-Rud Valleys, from Shahjui to Kandahar, by Lieutenant Gore, R.E. Scale 4 miles to an inch.—Map of the country around Kandahar. Scale 1 mile to an inch. 1879.—Quetta to Khelat-i-Ghilzai and Girishk; a rough combination of Surveys and Reconnaissances, 1878–79–80. Scale 4 miles to an inch.—Sibi to Quetta and Thall Chotiali to the Pishin Valley; a rough combination of Surveys and Reconnaissances, 1878–79–80. Scale 4 miles to an inch.—Reconnaissance of Country in the Tarnak Valley, in the vicinity of Kalat-i-Ghilzai, by Major W. M. Campbell, R.E., Deputy-Superintendent, Survey of India, and Captain E. H. Sartorius, 59th Regiment. 1879.—Index to the Sheets of the Bhopal and Malwa Topographical Survey, on the scale of 1 mile to an inch. —Index to the Sheets of the Gwalior and Central India Topographical Survey, on the scale of 1 mile to an inch.—Index to the Sheets of the Khandesh and Bombay Native States Survey, on the scales of 1 inch to 1 mile, and 2 inches to 1 mile. —Index to the Garo, Khasi, and Naga Hills Topographical Survey, on the scales of 1 inch to 1 mile, ½ inch to 1 mile, and ¼ inch to 1 mile.—Index to the Sheets of the Mysore Topographical Survey, on the scale of 1 mile to an inch. Index to the Sheets of the Rajputana Topographical Survey, on the scales of 1 inch to 1 mile, and ½ inch to 1 mile.

Petermann's 'Geographische Mittheilungen.'—Karte der Nordwestlichen Mongolei nach den Aufnahmen und Ortsbestimmungen von Potanin u. Rafailow, 1876 & 1877. Scale 1 : 3,500,000 or 47·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 8. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Kiepert, H.—Carte de la régence de Tunis dressée d'après les cartes nautiques de la marine Anglaise, les cartes de l'Algérie et de la Tunisie publiées par le dépôt de la guerre Français et les itinéraires des voyageurs Européens, surtout de feu M. Wilmanns, par Henri Kiepert. D. Reimer, Berlin, 1881. Scale 1 : 800,000 or 10·9 geographical miles to an inch. Price 2*s.* (*Dulau.*)

Kiepert, R.—Dr. Oskar Lenz' Reise von Tanger nach Timbuktu und St. Louis. 1880. Scale 1 : 12,500,000 or 171·2 geographical miles to an inch. Ges. für Erdkunde zu Berlin. 12th April 1881. (*Dulau.*)



MAP OF
SIKKIM
AND PARTS OF
THE ADJACENT TERRITORIES
to illustrate Sir R. Temple's paper

English Miles

W.J. Turner F.G.S. Del

Pubd for the Proceedings of the Royal Geographical Society 1881.

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Annual Address on the Progress of Geography.

By the Right Hon. Lord Aberdare, President.

(Delivered at the Anniversary Meeting, May 23rd, 1881.)

The President addressed the Meeting as follows:—

If my immediate predecessor Lord Northbrook, fresh from the Vice-Royalty of India—a vast empire—touching on so many points of geographical exploration, and possessed of the varied knowledge which in his previous office of Secretary of the Admiralty he could not fail to acquire, thought it necessary to apologise for occupying the honourable position of President of this Society, in what terms can I appeal to your indulgence for my presumption in filling a Chair so recently occupied by such accomplished geographers as Murchison, Rawlinson, and Alcock? The best, and indeed the only satisfactory explanation of the fact is that your Council, trained in every branch of research, discovered, or thought they had discovered, in me qualities which fitted me for that office in some of its bearings, and it was not for me to contest the wisdom of their choice.

The Report of the Council to which you have just listened has placed before you the financial position and the administrative work of the Society, both of which I trust you will consider satisfactory.

It remains for me to bring to your notice within the narrow limits of an Address, the progress of geographical exploration during the past year. Such of late years has been the fervour of geographical research; so many nations have taken an active part in the solution of geographical problems; so many interests, missionary, philanthropic, commercial, political, and scientific have combined to propagate the movement through every quarter of the globe, that every year the opportunities become rarer for making those discoveries which excite the imagination, and which bring sudden and large additions to our knowledge of the earth's surface. Not that the work of exploration is by any means exhausted. In the ice-bound regions of the Northern and Southern Arctic Circles, in Africa, in Central Asia, in Australia, the Indian Ocean, and in South America, are still ample fields to stimulate the enterprise and reward the labours of the scientific traveller; but the greater part of the work to be done—and a vast work it is, for but a small portion of the world has been accurately investigated—is to verify the discoveries of former adventurous but untrained explorers; and gradually and carefully to enlarge our knowledge of regions partially traversed at distant intervals, and still imperfectly known. In order that this work should be effectually done, the Society has instituted that system of instruction in the knowledge specially required by an accomplished traveller, which has already produced considerable results, and which promises to add every year, in increasing proportions, to our stock of accurate and well-digested information.

During the year that has passed, progress has been made in Arctic discovery and research in several directions. The most important addition to our knowledge of those ice-bound regions is that made along the south coast of Franz-Josef Land, by Mr. B. Leigh Smith, westward from the furthest point seen by the Austro-Hungarian Expedition. Our highest honour has been conferred, this year, as you have already learnt, upon Mr. Leigh Smith, not only for this discovery, but also for the useful geographical work he achieved in former years along the coasts of Spitzbergen. His expeditions have been equipped entirely at his own expense, and he has thus set a signal example of devotion to the cause of geographical research. With the enthusiasm indispensable to an Arctic explorer, he combines the attainments of a scientific observer and the skill of an experienced navigator. To these qualifications Mr. Leigh Smith adds that of indomitable perseverance—

> "Of courage never to submit and yield,
> And what is else not to be overcome;"

of which the best proof is that he is now busying himself with the preparations for his fifth voyage, in which, profiting by past experience, he hopes to penetrate still nearer to the hitherto unapproachable North Pole.

The Dutch exploring schooner *Willem Barents* made her third scientific voyage to the Arctic seas in 1880, under the command of Captain von Brockhüysen. Unfortunately she struck on the reef of Cross Island, off the north coast of Novaya Zemlya, and was disabled from pursuing her voyage. But with the characteristic tenacity of their nation, the promoters of Arctic research in the Netherlands, chief among whom is our accomplished associate Commodore Jansen, are resolute in continuing the good work. The *Willem Barents* has already, this spring, sailed on her fourth voyage. I am glad to say that our associate, Mr. Grant, who accompanied Mr. Leigh Smith to Franz-Josef

Land and made the admirable series of photographs which brought the newly discovered coast-line so vividly to our knowledge, is on board the *Willem Barents.* This is Mr. Grant's fifth Arctic voyage. He sailed first with Sir Allen Young in the *Pandora* to Smith Sound, last year with Mr. Leigh Smith, and three times with the Dutch. The fascination of the icy regions of the Pole, which has always had so strong a hold on naval and other professional explorers, has taken firm possession of this ardent volunteer.

Efforts were continued, last summer, to open a regular trade with the mouths of the Siberian rivers Ob and Yenisei, but 1880 was an unfavourable year. Two vessels, the *Dahlmann* and *Luise*, in vain attempted all the straits leading into the Kara Sea, and even rounded the northern extreme of Novaya Zemlya, without success. But two other vessels were more fortunate. The *Neptune* returned safely with a full cargo of wheat and rye from the river Ob, and the *Oscar Dickson* reached the Yenisei. Merchants are now convinced that, by selecting the proper time, vessels properly constructed for ice navigation may reach the mouths of the Ob and Yenisei every year, and that the trade may be conducted with regularity and certainty. Our associate, Mr. Cattley, is actively engaged in organising a service of vessels from this country, and a Danish Company has also been formed with a similar purpose. It is, however, necessary to provide suitable barges to bring the cargoes from the interior to the mouths of the rivers, and to make other needful arrangements, so that it is not likely that the trade between Europe and the ports of Siberia will be in regular working order until the summer of 1882. This will be one more practically useful result of Arctic exploration.

Arctic adventure has continued to attract attention and to bear useful fruit in the United States, and we have a good record of work from the American side of the polar regions. Although the journey of Lieutenant Schwatka was completed in the winter of 1880, we did not receive the full details of his achievement until last autumn. This journey, from Hudson's Bay overland and across ice to King William Land and back, is admitted to have been, in some respects, without a parallel, and reflects the highest credit on the commander of the expedition, as well as on those who served under him. Information was collected from the Eskimos respecting the crews of the *Erebus* and *Terror;* and the line of march of these gallant and unfortunate men along the west coast of King William Island, first examined by Sir Leopold M'Clintock, was again carefully gone over. Lieutenant Schwatka brought home many interesting relics, among which were the bones of Lieutenant Irving of the *Terror*, which were interred at Edinburgh with military honours. All other remains which were found above ground were carefully collected, and reverently buried, by the brave Americans who had undertaken so wonderful a journey mainly with the view of performing this kindly deed. Lieutenant Schwatka and his companions have earned the gratitude of all Englishmen, while their gallantry and perseverance as Arctic travellers have won for them the well-deserved admiration of geographers in all parts of the world.

Much useful work has been performed in the more accurate delineation of the coasts in the neighbourhood of Behring Strait by parties of the United States Coast Survey. A brief summary of their proceedings during the season of 1880, from the pen of Mr. W. H. Dall, is given in our 'Proceedings' for January last.

The expedition fitted out by Mr. Gordon Bennett, of the *New York Herald*, with the object of exploring the polar regions from the side of Behring Strait, started from San Francisco in July 1879, and was last heard of in the following September. It consists of the steamer *Jeannette*, commanded by Lieutenant De Long, of the United States Navy, and provisioned for three years. After the first winter, that of 1879–80, some natural anxiety was felt, and the United States revenue steamer *Corwin* was despatched from San Francisco in May 1880, with orders to use every endeavour to succour the *Jeannette*. The *Corwin* sighted Wrangell Land on the 11th of September at a distance of 25 miles, with impenetrable pack between the ship and the shore; but nothing was seen or heard of the *Jeannette*. The explorers have now passed a second winter in the Arctic Regions, and the United States Government are preparing to despatch a steamer—the *Mary and Helen*—for the purpose of searching for and conveying succour to the missing vessel. This vessel has been refitted for its mission in San Francisco, and will be commanded by Lieutenant R. M. Berry, of the United States Navy. I sincerely trust that before the close of the coming season we shall receive the news of the *Jeannette's* safety, and that Lieutenant De Long and his gallant companions have been restored to their friends, after having added largely to our geographical knowledge.

The surveys in India have advanced, during the last year, under the able guidance of General Walker, and much new information of great interest has been collected from Afghanistan and the valley of the Kunar. Captain Holdich, who served throughout the Afghan campaign, gave us a most valuable *résumé* of its geographical results in the paper which he read at our meeting on December 13th, 1880, and we have since had an interesting account of the Chugani and neighbouring tribes of Kafiristan from Colonel Tanner. This unvisited region of the Hindu Kush is one of the mysteries which remain for future enterprising travellers to solve. In addition to Colonel Tanner's investigations, the important volume written by Major Biddulph, and recently printed in India, in which he gives the results of his journey to Chitral, contains much information respecting the Kafirs. Major Biddulph received a deputation from them, but was unable to enter their country. He has, however, brought together a mass of information respecting these interesting people and their mountainous homes, which will be valuable to future inquirers.

As regards India, the recent Session has been signalised by two papers which, from their intrinsic merits and the graphic power of their author, have enabled us to realise the scenery and the physical characteristics of the regions to which they referred with unusual distinctness. I refer to Sir Richard Temple's two addresses, "the Highway from the Indus to Candahar" and "the Lake Region of Sikkim." By combining his own rare powers of description with a carefully arranged system of illustration, by means both of maps and coloured drawings, Sir Richard brought home to his audience the features of the countries described, and thus supplied knowledge by a channel which was as effectual as it was uncommon. He was very ably assisted by his brother, Lieutenant G. T. Temple, R.N., to whose rapid and vigorous brush the admirable illustrations were due. This young officer has on two other occasions materially increased, by his drawings, the interest of papers that have been read at our meetings; and it is to be hoped that this excellent method of enhancing the value of our papers will, whenever the materials exist and the artist can be found, be adopted in future.

The usefulness of the Indian Marine Survey Department, which came into existence in 1874, has now been fully recognised by a committee appointed by the Government, and presided over by General Walker. The Department has had many difficulties to contend against in these opening years, the most serious of which has been the want of a suitable vessel in which to execute the work. But in the Superintendent, Commander A. D. Taylor (late of the Indian Navy) and in the Chief Civil Assistant, Mr. Carrington, men have been found whose energy and zeal have overcome these obstacles. During the past two years the surveys of the port of Carwar, of Bankot, of Marmagao, and of the whole of the Bombay foreshore have been completed, and progress was made in a large scale survey of Rangoon. The Department, since 1875, has published 70 new charts, and has distributed 11,600 charts to Her Majesty's vessels and marine port officers, while 3000 have been sold. Besides these charts, notices to mariners, hydrographical notices, wreck and casualty reports, and light lists have been issued, and information has been supplied on numerous points relating to navigation. All this work has been performed with admirable promptness and accuracy, and when it is considered that previous to 1874 there had been no provision for executing marine surveys in India, it will be seen that the Marine Survey Department is now performing a most important service. A steamer has been built at Bombay for the use of the surveyors, and the recommendations of the committee include the taking of deep-sea soundings and other scientific work. There is, it may be hoped, a good prospect of continued usefulness for the Indian Marine Survey

Department; and while taking measures to secure the safety of ships frequenting the Indian seas, Commander Taylor and his colleagues will doubtless be able to contribute materially to geographical knowledge.

With regard to other parts of Asia, the chief geographical event of the year is the termination of Colonel Prejevalsky's important scientific expedition into Tibet, and the return of its leader to Europe. Since our last anniversary meeting news reached us that this distinguished explorer had, after being turned back on his march to Lhassa, quitted the Tibetan plateau and visited the Upper Hoango-ho. He is now engaged in preparing a grand work on the results of his expedition in eight volumes, which will deal largely with the sister sciences of geology and zoology.—Besides this important expedition, other geographical explorations have been accomplished by Russian officers and savants in these remote regions of Mongolia and Turkistan. The results of Dr. Regel's journey from Kuldja to Turfan in 1879, and of Potanin's researches in Western Mongolia, have been published in the course of the past year. Our own meritorious traveller, Mr. Delmar Morgan, has also added much useful information regarding the present condition of these central regions, by his journey last summer through Western Siberia and Semiretchia to Kuldja. Severtsof's journey in Fergana and the Pamir, translated by Mr. Lomonosof, and published in our 'Proceedings,' is also an important addition to our knowledge; and Major Clarke's summary of information regarding Kuldja, published in the August number of our monthly serial, deserves record.

Although it is not yet published, I may mention, as amongst the more noteworthy contributions to our knowledge of Asiatic geography, a paper we have received on a recent journey in the western part of the Chinese province of Sze-Chuen by Mr. Colborne Baber, Secretary of Legation at Peking. It is illustrated by a series of route-maps beautifully drawn by the author, and is considered by those who are well qualified to judge, to be quite worthy to rank by the side of the geographical work of Richthofen, Gill, and other European travellers who have done so much during the last decade in the same region.

In the apparently illimitable field of African exploration steady progress has been made during the year in filling up many minor blanks in our maps, but we have not to record any achievement of a very striking nature, such as the traversing of the continent in a new direction. Our own East African Expedition, as you are aware, returned last summer, and we heard at the opening meeting of this Session from the lips of its young and successful leader, Mr. Thomson, an interesting account of his journey. His paper was published in due course in the 'Proceedings,' and his barometrical and hypsometrical observations have since been computed and will be published, illustrated by a profile section of the country traversed, in the current volume of our Journal. Mr. Thomson has given a more detailed account of his travels in a popular narrative published in the present month, and within the last few days has left England on another journey of exploration in East Africa, having been engaged by the Sultan of Zanzibar to examine the coal-fields reported to exist in his dominions on a tributary of the Rovuma. As he has profitably employed his time since his return from his former expedition in receiving instruction from Mr. Coles in the use of instruments and in surveying, this zealous young traveller may be expected to contribute much towards completing the geography of the little-known tracts he will visit.

Mr. Thomson's journey has resulted in a distinct addition to our knowledge of the physical configuration of the interior of this part of the African continent, he having defined for the first time the limits of the great central plateau, the surface of which varies from 5000 to nearly 8000 feet in altitude, extending to the shores of Lakes Nyassa and Tanganyika and the new lake which he discovered, named after Prince Leopold; all lying in deep depressions in the plateau. He has also made known to us some 700 miles of new country, and was the first to traverse the space intervening between the two greater lakes. With regard to the determination of positions on the lakes by astronomical observations, we are greatly indebted to Mr. James Stewart, of the Livingstonia Mission, who followed closely in Thomson's track from Nyassa to Tanganyika, and who in the papers and maps presented to our Society has fixed with a precision which leaves little to be supplied, the geographical outlines of this important region. All that is now wanting to complete the map of Lake Nyassa is an exploration of its eastern shores along the foot of the Konde Mountains, which, according to Thomson, are only the escarpment of the central plateau, forming here precipitous heights of from 4000 to 5000 feet elevation, sheer from the lake waters, which we are told will shortly be surveyed by members of the Livingstonia Mission.

A little further to the west in the same region an interesting journey has been performed by another English traveller, Mr. F. C. Selous, who in 1878 penetrated for 150 miles the unknown country north of the Zambesi in the direction of Lake Bangweolo. The same traveller has since crossed in various directions the Matabele country, south of the Zambesi, discovering two new rivers and defining the courses of others previously known only from vague information. He has also explored the Chobe river, one of the chief tributaries of the Zambesi, recently shown by Major Serpa Pinto to be the lower course of the Cuando which descends from the Benguelan highlands. The same river is the subject of a paper communicated by Dr. Benjamin Bradshaw to the Society. Still further west an addition has been made to our knowledge of Ovampo-land and the basin of the Okavanga river, by Père Duparquet of the Catholic Missions. With regard to the recent geography of Africa south of these rivers, the admirable *résumé* given in this hall by Sir Bartle Frere in November last must be fresh in your recollection.

The equatorial region of Africa, from Zanzibar on the east to the Congo on the west, which has been the scene of the chief exploits in recent times of African travel, is now being traversed and explored by many parties of various nationalities and with various objects. First in order are the agents of the International African Society, which has its seat in Brussels. As recorded in the address of my predecessor last year, the first station of this Society was established at Karema on the eastern shores of Lake Tanganyika. The station has been reinforced by more than one party during the year, and the long route thither from the east coast opposite Zanzibar has become a well-trodden highway. M. Cambier, the founder of the station and leader of the first Belgian expedition, has lately returned to Europe, and has been received with great enthusiasm at Brussels and Antwerp. The attempt to introduce Indian elephants as beasts of burden, appears thus far to have failed, as only one out of the four sent to Karema reached it alive, and this survivor had not been employed as cargo-bearer. Captain Carter, the leader of the elephant caravan, and his companion, Mr. Cadenhead, unfortunately lost their lives in June last, in an accidental encounter with a war party of natives, when on their return to the coast. It does not appear, at present, that any new exploration has been accomplished by the numerous parties engaged in this enterprise, nor has any progress been made in the examination of the regions west of the lake. A well-equipped German expedition, under the command of Captain von Schöler, supported by a grant from the funds of the International Society, had according to recent accounts decided to found a station at Kisinda near the river Gombe, midway between Tabora and Karema. It reached Unyanyembe in October last, not without a hostile encounter with the natives, having been compelled to take part with one of the belligerents in an intertribal war.

The International Expedition operating from the West Coast, under the command of Mr. H. M. Stanley, has had the difficult task before it of making a practicable road along the mountainous shores of the river Congo, past the cataracts which obstruct its navigation for some 200 miles. The work, however, has proceeded steadily; a permanent station having been established at Vivi below the first falls, and a good road made for some 50 miles beyond it. Along this road the sections of steamboats have been conveyed which are intended to be launched on the navigable waters of the upper reaches of the river at Stanley Pool, whence more rapid progress is expected to be made towards the stations of the East African parties on Lake Tanganyika, the plan of the Association apparently being to establish a chain of stations across the continent. The latest news we have of these operations is that a party of seventy-two natives has been enlisted at Zanzibar for the Stanley Expedition, and that they have passed the Cape of Good Hope under the charge of two Belgian officers on their way to the Congo.

Meantime a remarkable geographical feat has been performed in the same region by M. de Brazza, in command of the French African Expedition on the Ogowé. This enterprising young explorer, who had previously distinguished himself by ascending to the head-waters of the Ogowé and crossing the watershed dividing that basin from the northern tributaries of the Congo, has, in a second expedition during last summer, descended these tributaries and reached the Congo itself, at a place above the long stretch of cataracts and far beyond the point reached by Stanley. He then marched down the banks of the river and met Stanley at Vivi, returning to the Gaboon and Ogowé by sea. This may justly be considered as the chief event in Central African exploration during the past year. A great addition to our knowledge of one of the most interesting parts of the African interior may be expected when the details of the journey are published. M. de Brazza, it may be necessary to remind you, is acting under the direction of the French branch of the International African Society, and is aided by a grant from the French Government. He has founded a first station, called Franceville, on the Upper Ogowé, and a second one, named Brazzaville, on the banks of the Upper Congo, at which place a tract of land had been obtained from the local chief. Our latest news, for which we are indebted to our associate, Mr. Baynes, is that two members of the Baptist Missionary Society, Messrs. Crudgington and Bentley, visited Brazzaville in February last, and found a small French garrison in the place.

Two English mission-stations have been established in the country of the Congo, the members of both of which give much laudable attention to the geography of the little-known regions they traverse. One of these parties, belonging to the Baptist Society above mentioned, has its headquarters at the town of St. Salvador, and has made repeated attempts, by the direct land-route, to reach Stanley Pool above the cataracts, but the hostility of the intervening tribes has hitherto proved an invincible obstacle. On his second journey, as recorded in our 'Proceedings,' the Rev. Mr. Comber, the zealous leader of the expedition, was shot down at Makuta by a hostile band; happily the wound was not fatal, and after recovering from its effects he started again in January last with a well-organised party, but has again failed. Previous to this, on a short journey of exploration in company with Mr. Hartland, he discovered the magnificent cataract which he has named Arthington Falls, in the Zombo Mountains east of St. Salvador, where the river Brije leaps down the steep escarpment of an interior plateau. The second party is called the Livingstone (Congo) Mission, and is at present working its way along the shores of the Congo towards the upper waters.

In the wide region of West Central Africa south of the Congo, of which, in spite of Cameron's memorable journey across it, we as yet know so little, a vast amount of new information was brought home last year by Captain Capello and Lieutenant Ivens, attached to the important Portuguese expedition of which Major Serpa Pinto was a conspicuous member. The two gentlemen just named, both officers in the Portuguese navy, visited England last summer, and attended the meeting of the British Association at Swansea, at the Geographical Section of which Lieutenant Ivens read a paper and exhibited the magnificent map, in manuscript, which he and his colleague were preparing to publish as part of the result of their explorations. The same wide region has been for some years past the field of labour of many successive German expeditions. Two of these have succeeded in reaching the distant capital of the great African potentate the Muata Yanvo, the first being Dr. Pogge some five years ago, and the second Dr. Buchner, who is still in the far interior and finds means of sending frequent letters to Europe, but who, we have recently learnt, is now obliged to turn his face homewards. We have also learnt quite recently that Dr. Pogge, with his companion Lieutenant Wissman, have left Loanda on another journey to the same region. From the West Coast, indeed, to Mussumbe, in the Muata Yanvo's country, the map of this region, thanks to the courage and enterprise of the Portuguese and Germans, is being rapidly filled up. There still remains, however, a great belt of country, watered by the Lualaba and its tributaries, and said to be studded with great lakes, untrodden by the European explorer.

Excellent work has been recently accomplished in the central regions west of the White Nile and Albert Nyanza, by Dr. Junker, Emin Bey, and others. Although so remote, this region appears to be far more practicable for travel than has hitherto been supposed. The two English missionaries, Rev. Mr. Wilson and Dr. Felkin, travelled the whole distance by land far to the west of the Upper Nile, on their return in 1879 from King Mtesa's dominions to the Egyptian stations in Nubia; and an Austrian artist, M. Buchta, has succeeded in bringing to Europe a wonderful series of photographs of scenery and natives, taken in regions more remote than those reached by Schweinfurth and Baker. The course of the famous river Uelle, discovered by Schweinfurth, still remains, however, an unsolved problem.

In other parts of Africa, there only remains to be noticed the expeditions on foot in the region of the Niger and the Sahara. These, however, seem to have in view commercial and political rather than scientific objects, and cannot, in an address like the present, be fully dealt with. Of this nature are the French expeditions from the Senegal to the Niger and across the Sahara from Algeria, undertaken partly for the purpose of preliminary survey with a view to the formation of railways, and partly to establish amicable and commercial relations with the native states. One of these expeditions, under Captain Gallieni, despatched from the French posts on the Upper Senegal to the Sultan of Segou-Sikoro, on the Niger, was on a larger scale than those previously mentioned, and although it lost several lives and much property in an encounter with the Beledugu people on the way, it appears to have succeeded in negotiating a favourable treaty with the Sultan. Another expedition, under Colonel Flatters, travelling across the Sahara from the north, came, as we all have read with extreme regret, to a disastrous end. Much new geographical information is being gleaned by these semi-military expeditions, and Colonel Flatters, before his untimely death, had communicated valuable facts and rectifications of maps to his correspondent in Paris, the eminent geographer Duveyrier. Another expedition last year across the Sahara, by the well-known geological traveller Dr. Lenz, under the auspices of the German African Society, was of a different character. This bold undertaking was successfully executed; Dr. Lenz, starting from Morocco, passed the Atlas to Terodant, and then traversing the Anti-Atlas, struck across the desert for Timbuktu, which he reached, returning to the coast by way of the French possessions on the Senegal.

I will conclude this summary by a brief reference to what has been accomplished in other parts of the world. In Borneo, as we learnt from Mr. Crocker, and the discussion which followed the reading of his paper in February last, some progress is being made towards lifting the veil from the unknown interior of that large and most interesting island. Recent travellers in the employment of the North Borneo Company had proved the non-existence of the great lake which still figures in most maps as an important feature in the interior, and a promise is held out of further exploration being undertaken. In New Guinea additions of small extent continue to be made to our knowledge of the interior, chiefly in the south-eastern part of the island. The most active in this work are missionaries in the service of the London Missionary Society, especially the Rev. W. G. Lawes (who qualified himself as a geographical explorer during his brief stay in England last summer, and has returned with an equipment of instruments from our Society), and the Revs. T. Chalmers and T. Beswick. The last mentioned has recently explored the Kemp-Welsh river which empties itself into Hood Bay. In the group of great islands to the east we have received and published during the year valuable original papers by Mr. Wilfred Powell (on New Britain) and Rev. G. Brown (on New Ireland).

In South America the most interesting work of the year is that performed by Mr. Edward Whymper in Ecuador, where he added to his great reputation as a mountain climber, by ascending to the summit of nearly all the great peaks of the Andes in that region. The journey of Mr. Whymper began, it is true, in 1879, but was terminated last summer, and it is only recently that he has communicated its general geographical results to our Society. His paper, which will be fresh in your recollection, proved to us that Mr. Whymper is not only the prince of Alpine climbers, but an observant and keen geographer. We have also had during the present Session an admirable account of the geography of Bolivia from another English traveller, Mr. Minchin, who has spent many years, occupied chiefly in surveying, in that remote and little-known region of South America, and given us the result in the paper alluded to and in a series of original maps of great geographical value.

With regard to naval surveys, the Hydrographer of the Admiralty has drawn up the following brief statement of the progress of his department during the past year.

There have been employed in survey work, during the year, 81 officers and 676 men, distributed among five steam sloops of war and seven supplementary smaller vessels. Their services have been rendered on the coasts of the United Kingdom; in the Sea of Marmara; in Carimata Strait, and other parts of the Eastern seas; on the coasts of China and Japan; the south coast of West Africa, between the Orange River and Walfisch Bay; in Magellan Straits and neighbouring waters, clearing up the existence and position of reported dangers in the South Pacific Ocean; a survey of the Fiji group; an examination of the southern shores of the Solomon Islands and their off-lying dangers; the completion of the survey of the seaboard of South Australia, and much useful work on the shores of Western Australia, in King Sound and its neighbourhood.

In the West Indies, the seaboard of Jamaica having been completed, its dependencies, the Lesser Caymans, have been surveyed, as also the Pedro bank with its numerous cays and dangers.

The harbours of Newfoundland are being proceeded with, and an interesting examination of a part of the Labrador coast between the Hudson Bay settlement of Rigoulette in Hamilton Inlet, and that of Fort Chimo within the Koksoak river in Ungava Bay, has been made by one of the officers of the Newfoundland Survey, taking advantage of the annual visit of the Hudson Bay Company's steam vessel to those trading ports.

Full details of these several surveys for the year 1880, together with the annual account of the labours of his department, have been drawn up by the Hydrographer; and from the growing interest that is being taken in the marine surveys conducted by the Admiralty, and which are so much valued by the seamen of all nations and so useful in the interests of commerce, this annual account is now laid on the table of the House of Commons. The full report will be subsequently published in our 'Proceedings.'

Conclusion.—Fifty years of our existence were reached in May 1880, and the fiftieth volume of our Annual Journal being in preparation, it was thought to be an appropriate occasion for reviewing the work of the Society during that period. Our Secretary, Mr. Markham, with the approbation of the Council, undertook the task, and has executed it with the skill and mastery which might have been expected of so accomplished a geographer. No better testimony could be offered of the influence, direct and indirect, exercised by the Society on the progress of that science of which it takes charge, than that unfolded in the pages of this most able and interesting summary. Its history of our past transactions will, I think, furnish the best proof that, with the widening interest taken in geography, the efforts of our Society have become more and more energetic; that the spirit in which it has been administered has not been narrow or insular, but, as it should be, unselfish and cosmopolitan; that the merits of travellers of all nations have been cheerfully acknowledged; that the meed of our approbation, never lightly given, has never been withheld from objects worthy of it; that every important scheme of discovery has received from it the advantage of thorough examination by a most competent tribunal; and, when approved, has often experienced its liberal aid, always its sympathetic encouragement; and that it has thus acquired, and by these means will, I trust, long retain the high position it has achieved among the scientific Societies of the world.

OBITUARY FOR THE YEAR 1880-81.

Our losses by death during the year ending April 30th reach the large total of 71 Fellows, besides two Honorary Corresponding Members. According to the custom recently established, a record of the decease, accompanied by a brief biographical sketch, of those who had distinguished themselves in geographical pursuits, and regarding whom the requisite information was obtainable, has been published from time to time in the 'Proceedings.' In this way notices have appeared during the year of the following:—Père ANTOINE HORNER (Hon. Corresponding Member); Colonel Sir W. L. MEREWETHER; The Rev. GEORGE MAXWELL GORDON; Mr. J. T. TOWSON; General E. T. DALTON; Mr. JOHN GOULD, F.R.S.; Captain T. L. PHIPSON-WYBRANTS; Sir D. BROOKE ROBERTSON, and Professor JAMES TENNANT. Since the date above mentioned, another loss of great importance has been sustained in the death of our Corresponding Member, Admiral LE BARON DE LA RONCIÈRE LE NOURY, which occurred on the 14th of the present month. This distinguished officer had been for many years President of the Geographical Society of France, and was held in deserved esteem by our neighbours for his high personal character and great abilities. A brief sketch of his career will be given in the Obituary pages of the next issue of our 'Proceedings.' Besides these, the list of deaths includes the names of the following Members, some of whom had earned reputation as geographers, and others, as will be observed from the brief allusions appended, were eminent in other walks of life:—

Dr. CANDIDO MENDES DE ALMEIDA, one of our Honorary Corresponding Members, known as the author of the very useful 'Atlas do Imperio do Brazil,' which, besides its numerous maps, contained an excellent Catalogue of all published cartographical material relating to the Brazilian Empire; he died on the 2nd of March last; Mr. RICHARD BAXTER; Sir CECIL BEADON, formerly Lieutenant-Governor of Bengal, who died on the 18th of July last; he evinced considerable interest in the proceedings of our Society, and occasionally took part in the discussions on subjects of Indian Geography at our evening meetings; Captain DANIEL BROWN; Mr. H. G. BEVINGTON; Mr. W. MOORE BELL; Mr. P. P. BLYTH, the well-known shipowner, for many years one of the Vice-Presidents of the Kosmos Club in connection with the Society; Mr. W. B. BASK; The Right Hon. Sir STEPHEN CAVE, G.C.B., who died on the 8th of June last, at the age of sixty; he had a high reputation as a State Financier, having filled the posts of Paymaster-General and Vice-President of the Board of Trade, and in 1875–6 was sent to Egypt by Lord Beaconsfield to report on the financial condition of that country; he had acquired, during a long parliamentary career, the respect of all parties by the zealous yet temperate advocacy of all well-considered measures of social reform, of many of which he was the munificent promoter; Mr. J. H. CHALLIS; Sir BRUCE CHICHESTER, Bart., who died on the 25th of January, at the early age of thirty-eight; Mr. W. W. CARR; The Earl of DALHOUSIE, who died suddenly on the 20th of July, 1880; Mr. A. DE LASKI; Major F. DU CANE, R.E.; Mr. BERNARD DIETZ; Mr. J. B. FOORD; The Rev. R. J. GOULD; Mr. WALTER GREEN; Mr. FELIX H. GOTTLIEB; Mr. G. GRANTHAM; Mr. ISAAC GREGORY; Mr. JAMES GRIGNON; Mr. T. H. GALTON; Mr. E. HENEAGE; Mr. ARCHIBALD HAMILTON; Mr. C. E. HERBERT; Mr. V. W. HOLT; Lord HANMER; Mr. M. B. JOHNSTONE; Mr. H. H. KENNEDY; Mr. R. L. M. KITTO; Mr. A. D. KEIGHTLEY; Sir FRANCIS LYCETT; Mr. F. LE BRETON; Rev. R. C. LUMSDEN; Rev. W. R. T. LUSHINGTON-TILSON; Mr. W. G. MCIVOR; Mr. M. H. MARSH, of Ramridge House, near Andover, late M.P. for Salisbury, who had settled for some years in Australia, had served there as Member of the Legislative Council of New South Wales, and had been one of the earliest and most efficient promoters of the development of the important colony of Queensland; by the shrewdness and ability with which he spoke on subjects which he had carefully studied, he had succeeded in winning the ear of so critical an assembly as the House of Commons; The Rev. R. NIMMO, Chaplain of the unfortunate training-ship *Atalanta*; Mr. H. M. OMMANNEY; Lord ORMATHWAITE, long known as Sir John Walsh, a distinguished member of the House of Commons, and the author of many political tracts and pamphlets; General Sir B. T. PHILLIPS; Captain CHARLES E. PRICE; Mr. EDWARD PARRY; Mr. H. D. PENDER; Mr. J. PATTINSON; Mr. W. B. RICHARDSON; CHEVALIER J. RAHLES; Captain W. F. ROBINSON; Hon. W. B. RHODES; Mr. J. T. RENNIE; Mr. E. W. H. SCHENLEY; Viscount STRATFORD DE REDCLIFFE, the great Diplomatist, who since his retirement from the post which he long held of Ambassador at Constantinople with so marked an individuality, and so powerful an influence over the counsels of the Porte, frequently attended our evening meetings, occasionally taking part in the discussions which followed the reading of papers; he served also on our Council in 1870; Dr. G. SUCHE, a gentleman who had travelled much in pursuit of botany in the southern provinces of Brazil, who died at an advanced age, on the 5th of September last; Mr. W. SPARROW; Colonel W. F. TYTLER; Mr. J. TAYLER; Captain J. F. TRIVETT; Captain CHARLES VINCENT; Mr. J. W. WILLCOCK, Q.C.; and, lastly, Field Marshal Sir CHARLES YORKE, G.C.B., a distinguished Peninsular and Waterloo Officer, who had served his country in many quarters of the globe, and who died in his ninetieth year, on the 22nd of November last.

Indian Surveys for the year 1879–80.

In India the progress of geographical science is ever active. Besides the laborious and minutely accurate operations of triangulation, topography, and revenue survey, required to complete a first survey of our Indian empire, these are supplemented by surveys carried on by either European or native agencies, under circumstances of far greater difficulty in the mountainous tracts which hem in India on all sides, where the presence of savage and hostile tribes not amenable to our rule and influence makes the surveyor's task one of the greatest difficulty.

The principal triangulation is fast approaching completion. During the season 1879–80 the chain of triangles between Cape Comorin and Madras, which has been for some years in progress, was completed, so that the principal triangulation may now be considered to be wholly finished in Southern India. In Northern India only a small portion of a single chain of triangles remains for execution, which will be probably completed within the next few months, and then the whole of the principal triangulation of the regions between Afghanistan and Burma will be finished. The extension of the Eastern Frontier Series as far as Bangkok in Siam has been carried to within a short distance of that town, but the unhealthiness of the district unhappily proved fatal to Mr. H. Beverley, a surveyor of long and valued experience.

In Afghanistan the resumption of hostilities in the latter part of 1879 led to the formation of two field survey parties, one under Major R. G. Woodthorpe, R.E., to proceed viâ the Kurram and Shutargardan to join General Sir F. Roberts' column, and the other under Captain Holdich, R.E., to join General Bright's column by way of Peshawur and Jalalabad. A timely halt near the summit of the Shutargardan Pass enabled Major Woodthorpe to ascend a neighbouring hill, and connect the triangulation of the Kurram Valley with that of the Logar and Kabul valleys, which now form a continuous series from Thull round viâ Kabul to Jalalabad. The outturn of work in Northern Afghanistan comprises surveys of a large extent of the Zaimukht country west of Kohat, of the Logar Valley, Kohistan, and Koh Daman, besides several points on the Paghman, Altimor, Deh-i-Sabz, and Karkatcha ranges, and detailed surveys of the country between Gundamuk and Kabul. Very acceptable aid was rendered by the native sub-surveyors, one Munshi having carried on the mapping of the Sherpur cantonments and of the country round it during the actual progress of the investment, and having continued to work through the city and surrounding districts immediately the siege was raised, and before it would have been possible for any European to have been so employed. The same man also undertook an exploration up the Kunar river into Kafiristan, travelling as a native doctor, and there is every reason to suppose he could have succeeded in reaching Kafiristan (for he was never suspected at any time) had it not been for an unfortunate and unexpected rising of the tribes in the vicinity.

The operations in Southern Afghanistan comprised surveys and reconnaissances of Candahar and the surrounding country, of the Argastan Valley, the Kadanai Plain, and adjoining localities, by Lieutenant St. G. C. Gore, R.E.; while Major E. P. Leach, V.C., contributed reconnaissances of the Argandab and Khakrez valleys, and the determination of various peaks and passes leading from the Argandab basin into the Hazara country. Unfortunately the whole of this material, together with some valuable notes concerning the Hazara tribes and country, was lost during the retreat from Maiwand and the subsequent evacuation of the Candahar cantonment. Efforts have, however, been made to replace these documents by fresh surveys, and these have been fairly successful. General Stewart's march from Candahar on Kabul viâ Ghazni enabled Lieutenant Gore to accomplish a most useful piece of survey work through the Khushk-i-Rud and northern portion of the Tarnak Valley, and on northwards through the Ghazni Valley and over the Sher-i-dana Pass into Wardak. As this furnishes a connection between the surveys in Northern and Southern Afghanistan, besides the position of several important places on the route and a copious list of heights, it will prove a material and most welcome contribution to our geographical knowledge.

In Beluchistan a rough reconnaissance was effected of the country situated within the triangle formed by Quetta, Thal, Chotiali, and Sibi; it is more or less incomplete, as the country was in an unsettled state, but around Sibi, Dadur, and a portion of the lower Bolan, a fair amount of good topography has been obtained. The combined operations in Northern and Southern Afghanistan and in Beluchistan furnish a total area of about 16,000 square miles of new geography.

A satisfactory attempt to determine the position of the head-waters of the Irrawaddy river was made by Captain J. E. Sandeman through the agency of a native surveyor, who was taught the use of the compass, to pace, and to observe double altitudes of stars with the sextant. This intelligent traveller succeeded in ascending the river as far as Mo-gung-poon, near which the river forks into two main branches, called Malee and Mehka respectively, the western one rising at a reputed distance of from six to eight days' journey, in a district bounded by snow-clad hills. A sketch map compiled from this explorer's note-book shows a remarkable agreement with the map compiled by Lieutenant R. Wilcox in 1828, and leaves little room for doubt that the claim of that enterprising traveller to have discovered the principal source of the Irrawaddy is good. There still remains, however, an eastern branch of the Mehka which awaits exploration, and which according to native information is derived from a very large lake called Nungsa in the territory inhabited by Chinese Shans.

On the extreme north-western frontier of British India, about Gilgit, some interesting triangulation has been done by Colonel H. C. B. Tanner in continuation of his previous season's work. This is one of the most mountainous regions of the globe, and the number of peaks this officer has succeeded in fixing amid difficulties of no ordinary kind, will help materially to clear up the drainage and orography of an important tract which marks the convergence of the Hindu Kush and Himalaya systems towards the mountain mass of Pamir. Colonel Tanner has determined, among other peaks, the position of two snow-capped summits beyond Chitral, and one north-west of Sarhadd, in the basin of the Oxus. He also furnishes an interesting description of the nature of the water-parting between the Indus and Gilgit rivers, the northern slope of which he surveyed, and of the celebrated mountain Nangaparbat, which, after a perilous journey, he succeeded in approaching from the northern side. The scene he describes as probably the most magnificent snow view on the globe. Standing on the brink of a tremendous precipice 16,000 feet in height, which rises sheer and unbroken from the forests and vineyards of Gor, at an immense depth below, he beheld the huge mountain, exhibiting a slope of very nearly 24,000 feet (vertical measurement), with its glaciers, snow-fields, ice-cliffs, and jagged needles of naked rock extending from the very summit down to the Indus, which flows in a deep and gloomy channel at its base. Colonel Tanner was enabled to fix Tirich Mir (to which his preliminary calculations assign a height of 24,000 or 25,000 feet), a peak on the southern slopes of the Hindu Kush north-west of Chitral, as well as a remarkable double peak of nearly the same height, about 10 miles south-east of Varg, in the Oxus valley. Not the least important of Colonel Tanner's researches consist in a rich botanical collection, and a series of notes on the *flora* of this region.

The systematic observation of the tides for determining the rise and fall at the principal ports along the coasts of India has been extended, so that there are now no less than fourteen ports, comprising such places as Aden, Kurrachee, Bombay, and Rangoon, as well as harbours of minor note, where this valuable aid to navigation is available in the form of printed handbooks.

Eastern Bolivia and the Gran Chaco. By J. B. Minchin.

(Read at the Evening Meeting, March 28th, 1881.)

Map, p. 448.

Bolivia, or as it was formerly called "Upper Peru," is a country quite unique in its geographical position and configuration. Situated completely within the tropics, it presents on its eastern side all that exuberance of vegetable and animal life which might be expected in such a latitude; while the western half of the country is a bleak and barren region, possessing a climate which, at least as regards temperature, might be compared to that of England or Northern Europe. Such an apparent anomaly will, however, be readily understood: the chain of the Andes may be roughly regarded as forming here a great loop, one side of which is represented by the lofty volcanic peaks which overlook the Pacific, and the other by the perpetually snow-clad summits of the "Cordillera Real," situated some 150 miles further eastward; these two ranges enclose between them a lofty plateau or table-land, broken and intersected by lower groups and ranges, and at an average height of some 13,000 feet above the sea-level.

The chief centres of population are situated on this plateau, or in the neighbouring mountain region, and enjoy a temperate and healthy climate, in some cases decidedly cold, though even during the winter months the extreme purity of the atmosphere allows the sun's rays to act powerfully. The country is well watered, and particularly in the northern part potatoes and grain are largely cultivated; here also we have the phenomena of a lake covering an area of 2000 square miles and nearly 2½ miles above the sea-level.

The southern part of the plateau, if bleak and barren, encloses great mineral wealth: many silver mines are profitably worked at the present time, but I will only mention the celebrated cerro of Potosi, a mountain which became a proverb for wealth, and which indeed produced over 300 millions sterling worth of metal. But the mining industry has to contend with serious difficulties; in common with most of Upper Bolivia, transport to the Pacific coast is effected exclusively by pack-mules and llamas, and it is almost impossible with such means to bring up adequate machinery. The consequence is, that ores which produce less than 20*l.* to the ton do not pay working expenses. Projects for railways have not been wanting—indeed their name is legion; but hitherto next to nothing has been done. That this is not altogether owing to a completely savage state of society appears evident from the curious fact that in Sucre, the capital, there is probably not a single house of the better class which does not possess a piano, although these instruments have to be carried on specially selected mules, across 150 leagues of desert.

Besides, on account of natural obstacles, the progress of this rich country has been retarded, in common with other Spanish American States, by the frequent political changes, if indeed the term political can properly be applied to what is often merely a party spirit for one or other unscrupulous agitator. It should, however, be observed, in justice to the character of the people, that probably in no country in the world can one travel with greater safety than in Bolivia (I except, of course, the completely wild parts in the east, occupied by savage tribes). During the first two or three years of my residence, I carried as a matter of course, when travelling, a revolver, but found at last that it was quite unnecessary. Highway robbery may be said to be unknown; even the remittances of silver to the coast, where a value of 40,000*l*. or 50,000*l*. is often carried by four or five muleteers, are never interfered with.

On crossing the Cordillera Real, the great eastern range of the Andes, the face of nature undergoes a complete change; the bleak scenery of the plateau here gives place to the forest-clad spurs and ravines which descend to the boundless plains of the east. This is the region which I have more particularly selected, under the term Eastern Bolivia, as the subject of my observations, partly on account of its being perhaps less generally known, and also because during the past three years I have had occasion to travel through it in different directions, and to make some original explorations.

Eastern Bolivia comprises that vast territory which extends from the slopes of the Andes to the banks of the Itenez and Paraguay, thus stretching from the 8th to the 22nd parallel, and embracing an area of some 350,000 square miles. It occupies the heart of the South American continent, and is crossed by the head-waters of its greatest rivers; it is separated from the Pacific by the high plateau and perpetual snows of Upper Bolivia, while on the north, east, and south, its boundaries are those of Peru, Brazil, Paraguay, and the Argentine Confederation. This midland position, and the fact that many of its navigable rivers are cut off from communication with the Amazons by the falls of the Madeira, explains why it has hitherto remained to some extent a *terra incognita*, at least in so far as regards civilisation and commerce.

As might be supposed, so extensive a region presents considerable variety, both as regards its physical configuration, its climate, and its productions. The more northerly part includes the forest-clad plains watered by the Upper Purûs, the Aquiry, the Mayu-tata or Madre de Dios, and the Madidi, and the spurs of the Cordillera in the province of Caupolican. Further south it embraces the continuation of these spurs through the "Yungas" or warm valleys of Larecaja and La Paz, and the open grass plains of Mojos, crossed by the splendid navigable and forest-lined streams of the Beni and Mamoré with their tributaries,—plains which embrace a large tract eastward of the Mamoré, and are succeeded by rolling lands and forests extending to the Itenez. Still further south it includes the forest plains and grass lands of Santa Cruz and Chiquitos, crossed by numerous ranges of lofty hills, and watered by many fresh and permanent streams, succeeded by a barren zone comprising some 20,000 square miles of the Northern Chaco, stretching from the Parapiti to the Bahia Negra, and presenting an almost uninterrupted extent of low thorny scrub with great scarcity of water. The extreme south of the district comprises the rich grass plains alternating with forest lands along the course of the Pilcomayo, and extends across the whole width of the Chaco.

The elevation of this region above the sea-level varies from 260 feet on the banks of the Paraguay, and 510 feet on the Mojos plains, to over 3600 in the ranges of Chiquitos, and to 11,500 at the limit of tree vegetation on the slopes of the Cordillera.

Though the annual variation of water-level of the Paraguay does not usually exceed 10 feet, yet this is sufficient to inundate the lowlands along its course; a large extent of these open lands periodically submerged is met with to the north-west of Lake Uberaba and in the Bahia Negra, which becomes covered with rich pasture on the subsidence of the river. From the 20th parallel south, to the confluence of the Pilcomayo, the Paraguay is nearly everywhere fringed with palm forests, which on the right bank extend to a distance of from four or five to twenty miles from the river.

The water discharged from the mountains during the heavy rains by the rapid affluents of the Mamoré causes this river also to overflow its banks and inundate large tracts of the Mojos pampas; while the level nature of some of the Chiquitos plains, and the consequent sluggish drainage, occasions partial inundations of a few inches in many places.

The only known lake of importance in the north of the territory is that called Rogoaguado, situated between the Mamoré and Beni, but its extent and position have not been accurately determined. In Chiquitos, Lake Concepcion is a sheet of water usually occupying some 30 square miles, though not exceeding ten to thirteen feet in depth in the dry season; from the mean of several observations, I found its height to be 951 feet; its rise during the rains does not exceed six feet, which is, however, sufficient to flood a large extent of level palm forest on its eastern side; on the north and south it is bounded by low hills; the San Miguel river, which drains this, forms another lake further north in the district of Guarayos. On the right bank of the Upper Paraguay, near the 18th parallel, are the three beautiful lakes, Uberaba, Gaiba, and Mandiore, fed in part by the waters of the river, and receiving, besides, streams which descend from the neighbouring ranges; with an average area of 25 square miles, they are, with the exception of the northern shore of Lake Uberaba, which is low and flat, bordered by lofty hills or picturesque and fertile slopes.

In the Chaco, between the Pilcomayo and the Paraguay, the Indians report the existence of a lake, probably near the 22nd parallel, which has not yet been visited by the white man; to the north-west of Fort

Olimpo on the Paraguay, various lakes were met with by Don Juan de Cominges, on an expedition made by him in the early part of 1879.

The eastern ranges of the Andes south of latitude 17° 30′ are chiefly composed of red and yellow sandstone strata, usually highly inclined, and the occasional hills met with through the Northern Chaco and the ranges in Southern Chiquitos are of the same formation; in the north and east of Chiquitos conglomerates and granitic rocks are met with; black limestone occurs in the Corumbá Mountains, and grey limestone near Lake Concepcion and in the ranges east of Santa Cruz. In the gold region of San Javier, shales, schists, and quartz rock cover a large tract of country; in the provinces of Caupolican, Larecaja, and Yungas, the spurs of the Cordillera are composed of coloured clays and decomposed shales and schists, overlying the Silurian slates; and the great plains, both of Mojos and Chiquitos, are generally of reddish yellow and sandy clays.

South American scenery is usually on a gigantic scale; the river and mountain systems are alike imposing; while the forest plains of Brazil and Eastern Bolivia, the rainless deserts of the Pacific slope, and the "pampas" of the Argentine Republic, each cover a vast extent of territory.

I shall never forget the impression produced on my mind by my introduction to Eastern Bolivia; I had entered the Republic from the Pacific coast, and it was after a residence of nearly two years in the mountainous region that I made my first journey to Santa Cruz de la Sierra. The Andes do not here sink down, as might be supposed, by gentle gradations, but terminate abruptly in the lofty rugged sandstone ridges called "la Serrania de los Incas," the furthest point reached by those ancient rulers of Peru, "the Children of the Sun," and a fitting rampart to their extended empire. It was after nine days' riding from Sucre, the capital, and on surmounting this range, that a sudden bend in the track brought me within sight of the plains, and involuntarily I checked my mule to contemplate so remarkable a view. The eye, so long accustomed to the broken outlines of the mountains, rested with a sense of relief on that immense sea, for such indeed appeared that dark blue forest, stretching out, apparently unbroken by the slightest undulation, and bounded by a horizon as sharply defined and as level as that of the ocean itself. I seemed indeed to stand on the dividing line between two worlds: behind me I pictured those endless wooded hills and barren ridges, rising in long succession to the bleak table-lands and to the silent summits of the Andes, only to sink at last 500 miles away on the shore of the Pacific; all this I had crossed, and now before me, and 4000 feet below, I beheld, spread out like a carpet, those plains which extend without interruption to the banks of the Paraguay and the pampas of the River Plate.

At a distance of some 40 miles I could clearly distinguish the broad white bed of the Rio Grande contrasting with the dark forest, while the river itself appeared as a silver thread, reflecting the rays of the rising sun.

The rivers of Eastern Bolivia belong to two systems, as tributaries of the Amazons or of the River Plate; with the exception of the Upper Paraguay and Itenez, they nearly all take their rise among the highest summits of the Andes, and descend their eastern slope; the tributaries of the Amazons draining the mountains as far down as the 20th parallel, and, southward of this, the streams which united form the Pilcomayo flowing to the Plate.

Of the Purûs and Aquiry nothing need be said, as the account of their exploration by Mr. Chandless has been published by the Society. Unfortunately they are separated by as yet unexplored forests from the populated parts of Bolivia, and consequently no attempt has been made to open communication by them with the Amazons.

The point of union of the principal head-waters of the Mayu-tata to the north-east of Cuzco, has been determined by Mr. Clements Markham; but the course of this river cannot yet be said to be known, though it appears evident that it enters the Beni, from the fact of the Peruvian colonel Maldonado having descended it till he reached the falls of the Madeira: the monks of the Cavinas Mission on the Madidi have also informed me that in an exploration made by them towards the north-east, they met with a large river whose position and direction quite correspond with this course.

The sources of the river Beni drain the La Paz Cordillera, containing the highest peaks of the Bolivian Andes. As they generally fall from the perpetual snow-line a depth of from 11,000 to 15,000 feet in the comparatively short horizontal distance of some 40 miles, they are usually in this part of their course merely mountain torrents; at altitudes, however, of from 1600 to 2000 feet above the sea-level, and long before issuing from the lower ramifications of the mountains on to the plains, they become navigable for rafts, by means of which communication and commerce are thenceforward chiefly carried on.

These head-waters of the Beni have not as yet been sufficiently examined by any person competent to form an opinion as to the extent to which they may be suitable for steam navigation: at Mapiri, 70 miles in a direct line from La Paz and 1500 feet above the sea, I found a depth of three feet with a three-mile current, at the close of the dry season; this depth cannot, however, perhaps be depended upon all the way down; and about 20 miles lower, at Huanay, lat. 15° 29′ 30″, long. 67° 51′ 30″, I measured a current of as much as eight miles an hour, extending over a few hundred yards. At another point, below the confluence of the Tipuani river, the channel is obstructed by a few large rocks which would require to be blown up. The La Paz affluent, or Upper Beni, is navigated by rafts from as high as La Espia in the province of Yungas, but it presents at intervals for some distance a series of small rapids: immediately below the confluence of this with the Mapiri river, the Beni for a short distance spreads over a very wide bed, the depth in the dry season becoming consequently reduced; this obstacle to the navigation, if necessary, might be removed by the construction of a few jetties to scour out a deeper channel. Below Reyes the Beni is navigated in *gariteas* or large canoes drawing as much as four feet, which descend to the mission of Cavinas, and to the india-rubber establishments much further down; but neither the confluence of the Mayu-tata, nor the fall which is known to exist, have as yet been reached from above.

In common with the other tributaries of the Madeira, the Beni navigation is unfortunately cut off from direct communication with the Amazons by the falls on the former river; but the exploration of its lower part, of the Mayu-tata, and of the section of forest which separates this latter from the Aquiry, is, I think, important as a possible trade route to Bolivia.

The Mamoré drains the Andes of Central Bolivia, few of which reach the perpetual snow-line. Of its various affluents, the Yacuma, a sluggish stream, and in this respect an exception to the others, is navigable to within some 20 miles of Reyes, the Chapare and Chimore to within a comparatively short distance of the important town of Cochabamba, and the Rio Grande to 60 miles from Santa Cruz. In this latter I found generally upwards of five feet depth at the close of the dry season, with a current rarely exceeding 3600 yards an hour. This river issues from the mountains in lat. 18° 55′, long. 63° 23′, where the Andes system attains its greatest width, extending from the Pacific over no less than 7 degrees of longitude; it continues for some 90 miles from this point too shallow and rapid for navigation, and below that its bed, over an extent of some 60 miles, is occasionally obstructed by numerous palm-stumps, the river having changed its course here twenty years ago, bending more to the west, and opening a new channel which separates as much as 40 miles from the former one, which has now to a great extent disappeared, becoming covered with a low vegetation. Clearing the bed of these stumps, which indeed should of themselves disappear in time, navigation might be brought to within 35 miles of the city of Santa Cruz.

The Parapiti is the most southerly affluent of the Amazons, though on some maps it has been represented as crossing the Chaco and entering the Paraguay. It issues from the mountains at a height of 2030 feet, in lat. 19° 59′ 18″, long. 63° 4′, where at the close of the dry season I found a volume of 65 cubic yards per second; but entering on a very sandy region it becomes completely absorbed during some months, about 20 miles further down. In the wet season it flows through a well-defined bed as far as lat. 19° 6′, long. 62° 22′, when it spreads over the forest, forming a series of creeks, whose waters, again uniting, cut through the southern range of Chiquitos at the Quimome Pass, forming on the north side Lake Concepcion, which in its turn drains off by the river San Miguel or Itonamas, and enters the Itenez immediately above the "Fuerte do Principe do Beira."

The Pilcomayo, having its sources in the lofty group of Livichuco, and in the "Cordillera de los Frailes," and receiving innumerable streams which flow from the barren ridges and great mining centres of Southern Bolivia, cuts through the last range of the Andes in lat. 21° 16′ 50″, long. 63° 25′, and enters on the plains of the Chaco at a height of 1456 feet above the sea-level; the fall from this point to the Paraguay is, therefore, about 1213 feet, but a great part of this is evidently in the proximity of the mountains, the rapid current here giving place to a sluggish stream further down. Various attempts have been made to explore this river in its course through the Chaco; these have, however, as yet proved unsuccessful, chiefly owing to the difficulties occasioned by the numbers of savages who inhabit its margins. It becomes much reduced in the dry season, when I found a volume of only 100 cubic yards per second; during some five months it carries a large quantity of water, but as in the case of the Parapiti, it appears that much of it is absorbed; moreover, a point has been reached where the river spreads out, flowing through several channels. At the same time, the navigation of the Lower Pilcomayo may prove advantageous to South-eastern Bolivia, especially if in connection with a railway up the gorge of the river, the only practicable outlet from the great mining district to the navigation of the Paraguay and Plate. From the neighbourhood of Potosi the river has an average fall in its course through the mountains of 0·42 per cent.

From accounts given me by the Indians of that region, it appears that the Pilcomayo does not receive any tributaries whatever in its course through the Chaco.

The Itenez, rising in the comparatively low mountains of the Aguapehy Cordillera, has a sluggish stream, unlike that of other Bolivian tributaries of the Amazons. Besides the streams Alegre and Barbados, descending from the Aguapehy Mountains, it receives as tributaries the rivers Verde, Paragau, and Baures, originating in creeks in the north of the province of Chiquitos, the river Itonamas (already mentioned as formed by the waters of the Parapiti), and the river of San Joaquim, rising in the neighbourhood of Trinidad. From the north-east or Brazilian side there are no tributaries of importance.

The Itenez is navigable during the whole year for vessels with a draught not exceeding three to four feet, from its confluence with the Mamoré to a few miles above the old city of Matto Grosso.

While engaged, in 1878, in setting out the boundary between Bolivia and Brazil, and in searching for the sources of the Rio Verde, I had occasion to make an expedition over the Matto Grosso mountains, when I succeeded in crossing this range for the first time, previous attempts having failed owing to a series of deep precipices formed by horizontal sandstone strata, which crop out on each side of the range.

The beautiful grass plateaus met with on the top of these mountains afforded excellent points of observation of the surrounding country. I noticed that the open lands of Chiquitos extend here nearly to the 14th parallel, being thence succeeded by a continuous forest, which stretches northwards as far as the eye can reach. I was much impressed by the extreme sense of loneliness which pervades these vast panoramas; the profound silence itself which reigns over them appears, more eloquently than by words, to call for the hand of man. Often indeed, on my journeys, have I stopped to contemplate some such scene, and to speculate on the time when the tide of immigration must at last reach those fertile regions, which will then offer a home and an independence to the overcrowded population of Europe, and to the thousands here who are willing to work but have no work to do.

The river San Joaquim may be navigated with great facility for some 70 miles, and the Itonamas as far as the rich province of Guarayos, while it seems probable that the communication in this direction might be extended up the river San Miguel towards Lake Concepcion by the construction of a few locks in this latter, which has a very sluggish current (900 yards an hour), and runs through a deep and narrow channel.

The extent to which the rivers Baures and Paragau may be suitable for navigation has not been determined. The river Barbados has a good deep channel, from its junction with the Itenez as far as the town of Casalvasco; while the Alegre and Verde are quite useless in this respect.

The river Paraguay, in so far as regards its tributary the Jauru, takes its source in the same group of mountains as the Itenez; it does not appear, however, that the construction of a canal to connect the two rivers, as has been proposed, would be in any way practicable, as the advantage to be gained would not be in proportion to the cost of such a work. The highest points navigable are a considerable distance apart, and separated by very broken ground. So much difficulty was experienced in 1877 in transporting the hull of a small steam-launch from the Jauru to the Itenez, that it might evidently have been carried with greater ease round the south side of the Aguapehy Mountains; the distance by this route being, indeed, over 200 miles, but the country generally being open and nearly level plain.

The valley of the Itenez is at a greater height than that of the Upper Paraguay. I found, from many observations in the neighbourhood of Matto Grosso and of the head-waters of the rivers Verde and Paragau, a mean height of 722 feet above the sea-level, while the country near the junction of the Jauru is only 525 feet; the lowest point of the watershed, about 20 miles to the south-west of the Aguapehy group, I found to be 950 feet above the sea-level.

Probably few rivers afford such facilities for navigation as the Paraguay. Besides many steamers which ply lower down, there is a monthly service subventioned by the Brazilian Government between Monte Video and Corumbá. This latter town, situated on the 19th parallel, is at a distance of 1500 miles from the sea, and yet the steamers (drawing from seven to nine feet) usually run without difficulty all the year; only during exceptionally dry seasons, and at one or two points, is there any obstacle to their passage. Steam communication, by means of smaller boats, is also maintained with Villa Maria and Cuyaba, capital of the province of Matto Grosso, some 200 miles higher up.

The mean of a great many observations gave me 348 feet as the height of the river at Corumbá, the greater part of this fall being undoubtedly due to the more rapid Paraná, the current of the Paraguay being only some 2700 yards an hour.

From its western or Bolivian side, the Paraguay does not receive any tributaries of importance north of the Pilcomayo; I found that the river Otuquis, which was supposed to enter it at the Bahia Negra, does not in reality do so, becoming absorbed in lat. 19° 4′, long. 58° 15′, at a distance of some 50 miles from the river, and terminating in a series of swamps which dry up completely every year; indeed, this occurs to a greater or less extent with the other streams which descend from the Aguapehy Mountains and the ranges of Eastern Chiquitos, the greater part of them becoming absorbed or forming creeks on reaching the lowlands adjoining the river.

The country bordering the Rio de la Plata and the Paraná, though fertile enough, is too uniformly flat to be pleasing, as it is only after some five days' steaming from the sea, and on approaching Asuncion, that the first insignificant hill is met with; but along the Upper Paraguay the monotony of the open grass lands and forests which border the river is constantly relieved by picturesque and richly wooded ranges. It is true that here, as elsewhere, distance often lends enchantment to the view, and the finest landscapes may hide a multitude of enemies. My own slumbers have never been disturbed by uneasy thoughts of snakes or panthers, though these are far from scarce; but the fortitude of an Indian warrior would be tried by the occasional attacks of the insects. In the rainy season, and especially in the proximity of large bodies of water, it is the mosquito proper which marshals its battalions against man and beast; at other times it is the *marigui*, a voracious though almost microscopic fly which disports itself by day and on moonlight nights, biting at every unprotected part of the body. In other districts the *garapata*, a kind of tick, of which there is a large but not pleasing variety, introduces itself beneath one's inner garments, and clings with such pertinacious obstinacy, as often to leave its head imbedded in the flesh when the body is torn away.

When camping for the night it is prudent to examine the ground, or one may be obliged to beat a hasty retreat before the onslaught of the *arriero* ants, who send forth their tens of thousands to levy black mail on the provisions. The distribution of these and other pests is, however, far from general; chiefly due to the superabundance of rank vegetation, they disappear to a great extent where the country becomes settled, drained, and cultivated.

The *tigres*, or jaguars, rarely attack man unless when brought to bay, but they do great damage to the isolated farms, killing off the young cattle.

With the exception of two or three species of Gallinaceæ and water-fowl, these forests contain few birds; but for the rifle there is often an abundance of game, the palm forests that border the Chaco, and the open grass lands generally, containing numbers of deer, ostriches, tapirs, and often wild cattle, while these and the neighbouring forests are ranged by immense herds of pigs.

Besides the mixed race of Spanish extraction, Eastern Bolivia is inhabited by many tribes speaking distinct languages, and all different from the Quichua and Aymara Indians who constituted the old Inca empire, and who do not appear ever to have descended from the mountainous region and the great table-land.

In addition to the "tame" Indians who occupy the greater part of these provinces, there are others, such as the Chamacocos near the Bahia Negra, and the Tobas and Notenes on the Pilcomayo, who have occasional intercourse with the settlements; the remainder, like the Sirionos on the Rio Grande, and the tribes on the Mayu-tata and Lower Beni, remain as yet completely savage.

Even the barren region in the Northern Chaco is inhabited by one or two wandering tribes, few in number, and I should say very low in the scale of humanity; they have occasionally made raids on the cattle farms on the Parapiti, and I met with them near the saline deposits in lat. 19° 18′ 32″, long. 60° 48′ 4″. These deposits are, indeed, evidently one of the chief attractions to them in a region otherwise so inhospitable. Some idea of the scarcity of water may be gathered from the fact that in 1879 I caused nearly 50 miles of track to be opened through dense, dry, thorny scrub, my object of crossing to the Parapiti being defeated, as no water could be found in the whole of this distance, even after a diligent search on either side, while borings to a depth of 26 feet were quite unsuccessful; the Indians, however, are evidently able to sustain themselves during long periods on the water met with between the vertical leaves of the cactus, or on what they can squeeze from the large pulpy water-potatoes, resources which I have myself often found useful.

The Chamacoco tribe appears to be somewhat superior. On one occasion they visited me to the number of about forty, behaving very well and evincing a good deal of intelligence. They evidently suffer much from the mosquitos along the river Paraguay, their naked bodies being scarred from these and the innumerable thorns and scratches of the forest. I found that shirts of any description were the presents most acceptable to them.

The more open lands further south in the Chaco have not such a sparse population, Señor Cominges having met with many small villages during his expedition in 1879; while still further south, along the Pilcomayo, the Toba Indians appear to be very numerous.

The Mojos Indians are probably superior to the other races: those of Chiquitos, though capable of great improvement, are at present more demoralised by drink, and by the petty tyranny of the Corregidores; while the tribes on the Parapiti and the settlements on the Pilcomayo are only just emerging from a state of barbarism, induced by the Franciscan monks to abandon their roving life, and form villages round the Missions.

An approximate calculation, based on tax returns and other data, shows that the province of Chiquitos and that part of Cordillera * east of the mountains, together with the town and neighbourhood of Santa Cruz, does not possess much over 90,000 inhabitants. In Chiquitos the population is at a standstill; in Mojos it is decreasing owing to the trade, which of late years has sprung up with the Amazons, and to numbers of the Indians remaining as little better than slaves in the rubber *estradas* of the Madeira. The excess of females over males is consequently large, the hands available for agricultural and other work being further reduced by the large number exclusively employed in the canoes, an evil which can only be remedied by the introduction of steam navigation.

In Mojos, trade is carried on chiefly by the rivers, all the towns and villages being situated as near these as the inundated lands will admit of, the distance at present navigated on these affluents of the Madeira falling but little short of 2000 miles.

In the provinces of Chiquitos and Cordillera communication is almost exclusively by land, yet little has been done to facilitate it, the principal roads being merely tracks from two to three yards wide, overshrouded to a great extent by forest, with a moderately good surface in dry weather, but becoming impassable in places during the rainy season.

Merchandise is transported to some extent on mules, but more generally oxen are employed both in carts and with pack-saddles. The following are the present freights:—

	£	s.	
Buenos Ayres to Corumbá (by steamer)	5	12	per ton.
Corumbá to Santa Cruz	43	0	,,
Santa Cruz to Cochabamba or Sucre	32	0	,,
Santa Cruz to Jujuy (Argentine Republic)	38	8	,,

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* The Bolivian province of Cordillera is situated on the left bank of the Pilcomayo, and embraces a large part of the Chaco; it must not be taken to mean the same as *cordillera*, the word applied by the Spaniards to snow-clad ranges of mountains.

The La Paz Yungas, and certain parts of the province of Caupolican being connected by better mule roads with the high table-land, are enabled to extract their produce at a more reasonable rate. The cinchona bark, however, collected in the forest, is now only met with in such inaccessible places that it has usually to be towed up the rivers on rafts and transported long distances on the backs of Indians; the total cost of placing this article in Europe being no less than 80*l.* per ton.

The productions of Eastern Bolivia are varied and important; extensive caoutchouc forests are at present profitably worked on the Lower Beni, and it is natural to suppose that they exist to an equal extent on the Mayu-tata and Aquiry; those on the Mamoré and Lower Itenez, though giving rubber of a superior quality, do so in less quantity.

The forests of Caupolican, Larecaja, and Yungas are the home of the Calisaya and other rich varieties of cinchona bark, still to some extent collected from the forests, while the cultivation of the plant during the last few years is being attended with surprising results.

In September last year I visited this region from La Paz; skirting the high table-land and the southern border of Lake Titicaca, I followed a track running north round the base of the great "Sorata." The tracks or paths which here cross that "land of the mountain and the flood," the La Paz Cordillera, are in Spanish politely termed *caminos* or roads; they do not, however, quite come up to our notions on the subject, and would require some explanation were it possible, which I am afraid it is not, to convey even a faint idea to persons who have not seen them. With a varying width of from one to six or seven feet, they run up and down the spurs of the mountains utterly regardless of gradient, becoming steeper and steeper as they approach the summit; here leaving behind all traces of vegetation, they are almost lost on the bare rocky surface. At places the long-suffering mule clambers across slopes of loose stone, lying at the limiting angle of friction, and split by the intense cold into sharp and angular fragments. At other points it is necessary to scale what at a distance might be mistaken for a winding staircase, but which turns out to be merely a succession of natural ledges, presenting a very narrow footing, and often with steps three to four feet deep. To increase the effect one usually becomes at last enveloped in mist, for the warm damp air from far below, rushing up the ravines on all sides, forms dense masses of vapour which wreath and curl round the black rocks. The momentary rents in this disclose, now the white foam of some cascade that seems to fall from heaven itself, now some bottomless pit yawning below, or a black beetling cliff far above, while occasionally at some dizzy height the sharp outline of a snowy summit is seen, apparently unconnected with the world beneath.*

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* The extreme transparency of the atmosphere in the Andean highlands strikes every traveller, and it requires some experience to be able to form a correct estimate of distances and heights, objects invariably appearing much nearer than they really are. I

On reaching the top of the pass, almost invariably at a height of from 15,000 to 16,000 feet, the track dips by a descent as precipitous and much longer on the eastern side; the barren rock again gives place to grassy hill-sides, and these in their turn to shrubs and bushes, the vegetation increasing in height and luxuriance as we penetrate the deep ravines.

The discomfort of sleeping, as I was obliged to, under the open sky, at a height of 14,000 feet, was, I thought, almost compensated by the view on the following morning; on looking towards the labyrinth of *quebradas* which dip to the valley of the Mapiri, I beheld a perfectly horizontal sheet of cloud, forming contour-lines round the mountains, and from which the lower ramifications rose here and there like dark islands in the ocean. The magical effects produced by the rising sun on this aerial lake did not, however, last long; soon commencing to dissolve, it disclosed the forest far below, losing itself in the dark-blue haze of depth and distance.

The cinchona plantations are at a height above the sea of from 1300 to 6000 feet, and are formed to some extent with the young plants from the forest, but chiefly from seed, the small plants being transplanted, when three to four inches high, to the bottom of holes six feet apart and some six inches square by a foot deep, the mouth of the hole being partially covered with a piece of bark: the young plant is thus protected till it reaches the surface-level, when the bark is thrown off, and it is able to bear the force of the sun. A year and a half from the time of the seed being sown, the plant attains a height of six to seven feet, and at the age of six years the trees are cut, each one yielding some 5 lbs. of dry bark. The cost of forming a plantation of upwards of 50,000 plants, a year old, may be calculated at the rate of 2½*d.* per plant.

The bark grown on the steepest slopes appears to be the finest, and the immediate proximity of the high Cordillera is evidently advantageous, probably owing to the greater amount of moisture in the air, the more clouded atmosphere, and frequent showers—as at equal elevations further east the quality is much inferior. The finest Calisaya district extends northward along the slope of the mountains from lat. 16° 30′. This region produces also coffee of the finest quality, but little known abroad owing to the high cost of transport, the production consequently not exceeding the demand of the nearest centres of population; indeed, very fine coffee is grown on all the eastern Andean slopes north of the 18th parallel, in the district of Guarayos, and on the ranges in other parts of Chiquitos, that produced on the lower plains being somewhat inferior. The privileged region of the "Yungas," or warm ravines of the La Paz Cordillera, produces, besides coffee, the plant yielding the

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have heard it remarked that St. Peter's at Rome is more impressive on a second than on a first visit, and this is the case with the great cordilleras—gradually there dawns upon one's mind a juster sense of their vast proportions and colossal magnitude.

coca so largely consumed by the Indian races of this part of the continent. The duty collected on this article alone by the Bolivian Government amounts to 40,000*l.* annually.

A fine quality of cacao is grown in the warmest ravines at altitudes below 2300 feet, on the inundated lands in Mojos, along the Mamoré, and in the district of Guarayos in Chiquitos. This article, as well as coffee and coca, besides being carried to all the principal towns of Bolivia, is exported on pack-mules to the north of the Argentine Republic, and, excepting coca, even to Corumbá and Buenos Ayres by the River Plate.

The cultivation of the sugar-cane is nearly everywhere carried on, a great extent of the richest land for this being met with at many points throughout the territory. Near Santa Cruz a fine steam-mill has been working for the last five years, but with this exception the cane is crushed in the primitive vertical wooden mills of the country, worked by oxen.

Among the mountain ranges on the Pilcomayo the vine flourishes, and vineyards are in course of formation which promise good results. Certain parts of Mojos and Chiquitos produce a fine-flavoured tobacco, and white and brown varieties of cotton grow wild on nearly all the lower plains, being employed by the Indians in the manufacture of light stuffs, much used in the country, and extremely durable. Rice and maize are largely grown, and mandioca replaces the potato, which is scarce except in the country immediately bordering on the Andean highlands, or in the neighbourhood of the Paraguay, where the facility of the navigation allows of its being brought from down the river.

Indigo is cultivated, though to no great extent, by the Indians for dyeing their cotton-stuffs, and vanilla is found in the lowlands of Northern Chiquitos, along the courses of the rivers Paragau and Baures, and in the district of Guarayos. A low species of cactus, the fibres of which may be employed in the manufacture of paper, covers immense areas in the barren region of the Northern Chaco. Copaiba trees, and the *pessoe*, which produces an oily fruit, abound in Southern and Eastern Chiquitos; the mapajo or vegetable silk, is everywhere abundant south of the 17th parallel; and in the neighbourhood of Matto Grosso I met with the Paraguay-tea plant.

Many kinds of medicinal plants exist, among which in Central Chiquitos there is an interesting bulb regarded as a perfectly efficacious antidote for snake bites. The forests of these regions contain some valuable woods, but the cost of land transport prevents their being utilised, except in the neighbourhood of the river Paraguay, where some trade is carried on. Curupay, the bark of which is used for tanning, is met with in all the forests of Chiquitos and in abundance on the Pilcomayo. Along the Rio Grande I saw numbers of mahogany trees from three to seven feet diameter.

In the rivers Tipuani, Challana, Cajones, and others which descend from the high Cordillera, very rich gold deposits exist which, in spite of the rugged nature of the country and the impossibility hitherto of obtaining adequate machinery and materials, have at times yielded largely. The gold in this case is found collected on the "bed rock," usually met with a few yards below the river-beds, and is also disseminated through strata in the adjoining mountains. Gold deposits also exist at San Simon on the Itenez, in the Caparus group, and in the low hilly district of San Javier on the right bank of the river San Miguel, where mines are at present worked in a primitive fashion. In the province of Caupolican, and in the mountain ranges on the Pilcomayo, various petroleum springs exist, which have not yet been scientifically examined, but which later on may prove of importance. In the Corumbá Mountains there are great deposits of iron ore, and the fine black limestone found there is an important article in the trade of that town.

Cattle-breeding is a profitable industry in Eastern Bolivia, and capable of great development; the "pampas" of Mojos present a vast extent of the finest grazing country. Could the falls of the Madeira be avoided, either by a railway round them or by opening communication with the Amazons by the Aquiry and Purûs, a ready market would be found in the Brazilian provinces along the great river. In the same manner, were roads opened up to Cochabamba and Lake Titicaca, the Andean table-land, and even the Pacific coast by the Puno and Mollendo railway might be cheaply supplied with meat. In the provinces of Chiquitos and Cordillera the estancias, situated mostly on the head-waters of the Paragau and Baures, round Lake Concepcion and along the Parapiti, contain 120,000 head of cattle; but besides these, there are large tracts of fine grazing country to the north-west of Lake Uberaba, in the palm forests that fringe the Paraguay, and in the south of the Bolivian Chaco along the course of the Pilcomayo. The price of cattle in Chiquitos is from 25 to 35 shillings a head; in Mojos it is somewhat lower. The value of the articles exported annually from the Yungas of La Paz, Larecaja, and Caupolican exceeds 1,000,000*l.*, the most important of these being cinchona bark, coffee, cacao, and coca. Mojos exports annually some 560 tons of cacao, cotton-stuffs, &c., to Cochabamba and Santa Cruz, the river freight amounting to 3000*l.* The exports of Santa Cruz, consisting chiefly of sugar, coffee, chocolate, and hides, to Upper Bolivia, and of cattle to Corumbá, amount annually to a value of 65,000*l.* Cattle and sugar are also exported from Chiquitos to the Brazilian provinces, and from Cordillera to the Argentine Republic.

The imports of the eastern district consist chiefly of foreign merchandise, and flour, potatoes, salt, &c., from the highlands; while the southern provinces import, in addition, horses, mules, and donkeys from the Argentine Republic.

With the exception of some of the deeper ravines in the Cordillera, and of certain points on the Itenez where intermittent fevers prevail, the climate of Eastern Bolivia, though tropical, is salubrious. This is probably due to the large extent of open country, and to the ventilation of the atmosphere by the frequent winds; the effects of the warm breezes from the Amazons being, moreover, constantly counteracted by the cold, dry, and refreshing southerly gales.

The mean temperature in Western Chiquitos is 70° F., the thermometer frequently falling during the prevalence of southerly winds as low as 44° F., and seldom exceeding 90° F. The fall of temperature on a change of wind is very rapid; I have observed the mercury, on such an occasion, sink 23° in less than fifteen minutes. The banks of the Paraguay and Itenez are warmer; in Caupolican, Larecaja, and Yungas the great range of altitude gives, of course, a corresponding variety in the temperature.

The wet season is well marked, usually commencing about the middle of December, and lasting till April, while there are occasional showers during the rest of the year. The rainfall appears to be nearly uniform, with the exception of the Northern Chaco, where it is evidently less, probably owing to the moisture brought down by the northerly winds becoming discharged in the mountain ranges of Chiquitos.

The late Professor Orton, who died three years ago while engaged in his self-imposed task of exploring the river Beni, remarks in one of his interesting articles on South America, "Many may be surprised to learn that this continent, with only 25,000,000 of people, gives a foreign trade of 100,000,000*l.* in exports and imports, which is nearly 9 per cent. larger than the total foreign commerce of India, and three times that of China, and yet only the margin of the continent has been developed, the great heart is as wild and prolific as nature could make it."

If, then, South America is of such importance under these circumstances, what may we not expect when her vast interior becomes opened up, and when the tide of immigration, spreading over and utilising her boundless pampas and inexhaustible forests, reaches at last to the fertile slopes of the Andes. The Argentine Republic and Brazil are making efforts to prolong their railways in this direction, and the latter country has done much to foment the already important navigation of the Amazons and River Plate. Bolivia may, then, look forward to a not very distant future, when those obstacles being at length overcome which have hitherto isolated her from the civilised world, her rich and varied products may find a rapid and easy exit to the ocean.

The construction of the Panama canal will undoubtedly give an immense impulse to trade in the Pacific, which will then be independent of the long and sometimes even dangerous navigation by way of the Straits of Magellan; Bolivian territory on the western slope of the Andes will feel the full influence of this beneficial change. And thus it is to be hoped that a country, at present poor and needy, while possessing such vast resources and natural wealth, may at last be enabled to take the place which is expected of her in the scale of nations.

I append a list of the geographical positions and heights of some of the more important points. The longitudes of a few places have been determined, for the sake of reference, by occultations of fixed stars; these are marked with an asterisk (*). The others are from observations with excellent marine chronometers, transported in a light hide box, slung from a horizontal pole, and carried by two Indians on foot. I found this system give admirable results, as the movement was easy, and the instruments could not be rapidly turned; one of them, on a journey of a month's duration in the Chaco, indicated on its return only three seconds variation over its established error, and on another occasion, after passing over more than 500 miles in the province of Cordillera, its variation was only two seconds.

The heights have been calculated with boiling-point thermometers by Casella, corrected at the Kew Observatory, the observations having been repeated at intervals whenever possible.

Name of Place.	Latitude.	Longitude West of Greenwich.	Height in Feet above the Sea-level.
	° ′ ″	° ′ ″	
Santa Cruz*	17 46 55	63 5 34	1450
Lake Concepcion	..	..	951
San Jose (Chiquitos)	17 50 40	60 40 19	974
Cerro Chochis	..	..	3914
Santiago*	18 20 14	59 31 24	1916
Corumbá*	19 0 3	57 37 45	459
River Paraguay, lat. 19°	..	..	348
San Miguel	16 41 52	..	1463
Santa Ana	16 36 38	60 37 0	1512
Matto Grosso	15 0 4	59 52 20	..
Head-waters of River Verde, boundary pillar*	15 5 50	60 28 32	695
San Matias	16 21 12	58 17 0	485
Santo Corazon	17 58 30	..	908
Salinas de San Jose	19 6 38	60 51 49	955
„ de Santiago*	19 18 32	60 48 4	751
Cerro San Miguel	19 18 10	60 34 22	2560
River Parapiti loses its bed	19 6 0	62 22 0	1410
Cerro Curundaiti	18 59 0	61 58 0	..
Cerro Cortado	19 33 0	62 12 0	..
Saipuru	19 31 22	63 6 11	2854
Parapiti (mission)	19 59 18	63 0 54	2053
San Francisco (mission)	21 16 50	63 20 0	1479
Lagunillas (town)	19 38 54	63 33 34	3353
Bivosi (village)*	17 13 35	63 9 0	..
Higuerones (head of navigation on Rio Grande)	16 38 45	63 20 45	..
Mouth of Bahia Negra*	20 8 38	58 8 22	318
El Huanay (town)	15 29 30	67 51 30	1466
Sorata (town)	15 45 50	..	8720
La Paz (city)*	16 29 59	67 59 45	11952
Cochabamba (city)	17 23 38	66 17 30	8396
Sucre (city)*	19 2 45	65 17 0	9183
Totora	17 44 41	65 14 0	9452
Mapiri	..	..	1500

In introducing the author of the paper, the **President** said that Mr. Minchin had not simply travelled through Bolivia as a visitor, but had spent seven years in the country, three of which had been passed in the great plain between the Andes and the borders of Brazil. Though the country had been so long inhabited by a people of European race, it was still but little known to Englishmen.

On the termination of the paper—

Mr. E. D. Mathews, C.E., thought the geographical world was greatly indebted to Mr. Minchin for the information that he had afforded about this little-known country. He had met Mr. Minchin in Bolivia, and could bear witness to the extreme care and minute accuracy with which he took his observations. It was therefore to be hoped that the maps of the district would be substantially added to by his paper. Bolivia had three outlets or routes of communication with the outside world, but one—that by the Pacific—was of so little value that it might be left out of consideration altogether. The slope on the western side of the Andes was so steep that the export trade by that route could never reach a large amount. In addition to this, the coast-line was at present in the possession of Chili, and probably Chili would act wisely in keeping it. The remaining outlets were northward by the river Madeira, and southwards by the river Paraguay. Mr. Minchin had stated that there was a very large sandy desert in what was generally known as the Gran Chaco, and that it was subject continually to inundation. That showed that the Paraguayan route would never be very useful. He himself was an advocate of the northern route, and he thought Mr. Minchin might have mentioned in his paper what was really a great calamity which happened about a year ago, namely, the winding-up of the scheme of the Madeira Railway by the division of a large fund which had been deposited in the Bank of England, among speculators who had bought up the old bonds of that undertaking. That had thrown the country back for at least fifty years. The rapids on the Madeira, a short distance from Cochabamba, were a great obstacle to navigation, and it had been proposed to make a railway there. He had been pleased to hear such a favourable account of the trade and resources of Bolivia. Its climate was so varied, its products so many, and of such excellent quality, that if an export trade could be opened up, the country would become one of the most prosperous in South America. Notwithstanding the fevers and the insects, any one who was willing to work could not find a better scope for his energies than Bolivia afforded.

Mr. Reader Harris said he felt a certain pride in the fact that it was upon his invitation that Mr. Minchin first went to South America, and he could bear his testimony, as Mr. Mathews had done, to the care with which he took his observations and calculated them out on the spot. There were very few countries in the world less known than Eastern Bolivia. A good many years ago, when he first intended to go to that country, he applied to a member of the Royal Geographical Society to obtain information as to the best route to follow, and the answer he received was, "You cannot do better than go by Dover and Calais." The gentleman evidently did not even know where Bolivia was. The area of that country was about 500,000 square miles, or as large as England, France, Spain, and Portugal put together. Its average elevation was about 10,000 feet above the level of the sea. Although Mr. Mathews had said that the trade never would go to the Pacific, yet it had gone there, and was going there now; in fact, at the present time it was the only route, but he believed that in future the route which Mr. Minchin had described would successfully compete with it. At present some traffic passed through the Argentine Republic viâ Tupiza. He had travelled along part of the route himself, and found it a very bad road, made to a great extent through river beds. Next there was the route from Cobija to Potosi, the objection to which was that it was principally a desert without water, and occupied from a fortnight to three weeks to traverse.

The chief outlet for many years had been through Arica and Tacna, to which there was an excellent road. Beyond that there was a railway from Mollendo through Arequipa to Lake Titicaca; but the route ended at the lake and did not enter Bolivia, to reach which a journey had to be taken in a small steamer, and afterwards in a coach as far as La Paz. Of course the great objections to all these routes were the difficulties and expenses connected with trans-shipment, which were very serious. The aim of all who wished well to Bolivia was to get a route with the fewest possible trans-shipments, and he thought it would be found on the eastern side of the country. Mr. Minchin had stated that a steamer drawing nine or ten feet of water could go up to Corumbá, while vessels of less draught could pass up still further, and from Corumbá to Santa Cruz the country was level. He thought the time was near at hand when a road or railway would be constructed from the navigable part of the Paraguay river to the two centres of trade. Only last autumn the Bolivian Congress granted a considerable concession to a company to be formed in Europe for the colonisation and opening up of Eastern Bolivia. It was a remarkable concession, because the territory was practically conceded for a term of years, the duties of the company being, to a great extent, confined to making roads in their own district. Very soon he hoped to see that company in active existence. The scheme would provide for any number of emigrants, and would be a step in the right direction towards missionary enterprise in South America. At present there were no Protestant missions in Bolivia, but the concession granted liberty of religion. The opinion he had expressed as to the south-eastern route being the best, was shared in by every traveller who had visited the neighbourhood.

Mr. Clements Markham said it was a very great satisfaction to him to have heard a paper read describing the exploration of a region in which he had long taken a deep interest, the more so as the observations for latitude, longitude, and elevation had been taken with great care. It had always been considered very difficult to penetrate to the eastward of Bolivia. In the year 1777 a treaty was made between Spain and Portugal, when it was arranged that an international commission of the two countries should go and measure the boundary. The Spanish commissioner found his way to Santa Cruz de la Sierra, and waited there for many years till he died of old age, but his colleague never arrived. At last Count Castelnau and others explored the course of the Madeira, and valuable light had been thrown on that region by Colonel Church. He himself once tried to penetrate through the forests, and met a fine old Italian monk, who had lived there for many years, and who looked forward to the very thing happening that Mr. Harris had prophesied, namely, that the products of the Eastern Cordilleras should find their way down the Amazon to the Atlantic. It was to be hoped that the desire of the old monk would be realised by the new company which was being formed. The monk made a long journey to Cuzco to publish a little book on the subject, in which he expressed a conviction that in the years to come the rivers at the sources of which he had been working, and which flowed down to the Beni, would be thoroughly explored, and a flourishing trade be established from the eastern slopes of the Cordilleras to the Atlantic. Such men as Mr. Minchin were the pioneers who would eventually lead South America to this wished-for consummation.

The President said he was sure the Meeting would agree in passing a cordial vote of thanks to Mr. Minchin for his interesting lecture. During the last five years, four papers only had been read before the Society on South America, but meanwhile very numerous addresses on various parts of Africa had been delivered, and listened to, often, by crowded audiences. He had asked himself why it was that the interest of Englishmen was almost exclusively confined to the continent of Africa. He supposed it had partly arisen from its being the scene of the labours of missionaries such as Moffat and Livingstone, whose adventures and spirit of self-sacrifice had roused attention to the country. In addition to this, the fact that South America was in the hands of white people, whose possessions Englishmen were bound to respect, and not in the hands of black people, whose possessions they were not in the habit of respecting, might have had something to do with the difference in the interest manifested in the two continents. Whatever was the cause, it certainly was a fact that very little public attention had been directed to South America. Bolivia had, with great justice, been called a *terra incognita* by Mr. Minchin, and it would probably be casting no reflection on those present if he said that, in all likelihood, by far the greater part of the information given in the paper was as new to them as it was to himself. Many of them remembered what a flood of light was thrown upon a great part of the South American continent, to the north of Bolivia, by the interesting book written by their Assistant Secretary, Mr. Bates. All those who read with admiration the account of those eleven years of the life of a naturalist on the Amazons, would recollect how much the deficiency of supply of animal food was felt in that region. It now appeared that thousands of cattle roamed through the rich grassy plains of Bolivia, and all that was needed was the means of connecting that country with the populations on the banks of the Amazons. Mr. Minchin had told him that the hides and tallow were utterly wasted; while, on the other hand, it was well known that myriads of cattle were slain on the great pampas of La Plata, simply for the sake of their hides. From what Mr. Harris had said, it appeared to be certain that in future a great deal more would be heard of Bolivia. Much of the value of Mr. Minchin's paper consisted in the figures and appendices, which could not be read to the Meeting, though they were of the highest importance to the scientific geographer.

GEOGRAPHICAL NOTES.

Exploration of the River Beni in Bolivia.—Dr. Edwin R. Heath, who some time ago went to South America to explore the Beni and other rivers of Bolivia, in continuation of the work of the late Professor Orton, has sent to the United States an account of a successful journey which he made last autumn. On September 27th he started in a canoe from Cabinas, a rubber camp on the Madidi, an affluent of the Beni from the left bank, and after various delays in his journey, on October 8th discovered a new river entering the Beni from the south. Four hours later on the same day he reached the confluence of the Madre de Dios with the Beni. By rough measurements he found the breadth of the latter to be 735 feet, and that of the former 2350 feet. It is satisfactory to learn that Dr. Heath here took careful observations for latitude and longitude. Early on October 9th he passed the mouth of a river, about the size of the Yacuma, coming in from the north, and this he named the Orton. Continuing his descent of the Beni, he passed some large islands, and on the morning of October 10th came to a line of rocks obstructing the river. A mile further down the main fall was reached, where there is a perpendicular drop of 30 feet. The canoe was removed to the lower river, and early on the following day, October 11th, some rocks were met with corresponding to the Palo Grande rapids of the Mamoré. At 10 A.M. on the same day the junction of the Beni and Mamoré was reached. Dr. Heath then ascended the latter river for 300 miles to Exaltacion and Santa Ana, whence he crossed the pampas to Reyes, from which place his report was despatched in the latter part of last December. Dr. Heath particularly mentions that, from the confluence of the river Madidi down to its mouth, only four families of Pacavara Indians were met with along the Beni, instead of the large numbers of man-eating savages whose reported existence has hitherto deterred the indiarubber collectors from making use of this natural highway for their trade. Up to the time of Dr. Heath's explorations they appear to have taken their produce from the Madidi for 200 miles up the Beni to Reyes, and thence across the pampas for another 200 miles to the Mamoré.—As Dr. Heath claims to have been the first white man to see the mouth of the Madre de Dios, it may be interesting to remind our readers that in a paper * read before the Society on February 25th, 1867, our Honorary Corresponding Member Professor Raimondi informed us that in March 1861 Don Faustino Maldonado, of Tarapoto, in Peru, with seven companions, had descended the Madre de Dios into the Mamoré, and that though the leader and three others were drowned in the dangerous rapids called the Calderão do Inferno, the remainder continued their voyage down the Madeira into the Amazons.

Progress of Exploration in the Region between the Rovuma and Lake Nyassa.—By letters which we have lately received from the Rev. Chauncy Maples and the Rev. W. P. Johnson, of the Universities' Mission Station at Masasi, we learn that the latter had followed the river Lujenda in his journey to Mataka's in the latter part of last year, and, though without instruments, had been able to lay down the course of the river for the first time with some approach to definiteness. The source was, however, still a mystery, but native report is unanimous in declaring that the river springs from a great lake to the east of Nyassa. As Mr. Maples observes, that lake cannot be Lake Shirwa, and he, therefore, thinks it probable that a good-sized lake still remains to be discovered to the north or north-east of Shirwa. Mr. Johnson's letter is dated "near Mataka's town, October 31st, 1880," and he mentions that he hopes to be able to make excursions for some time into the country between the Lujenda and Lake Nyassa, so that the source of the river will probably be determined before long. He also tells us that he has made a rough map of the Masasi district, in addition to the one alluded to by Mr. Maples. From the maps and letters, Mataka's new town appears to be about a degree south of the old site laid down in the map accompanying Livingstone's 'Last Journals,' and nearly in the same latitude as Livingstonia. Mr. Johnson indicates its position as approximately south-east of Makangila's and north-east of Mponde, near the mouth of the Shiré.—Mr. Johnson has since been compelled to visit Livingstonia, and the Rev. W. H. Penney, the London Secretary of the Mission, has obligingly placed in our hands a letter written from that place on February 16th. From this we learn that there has been a severe famine at Mwembe (Mataka's town), and that latterly Mr. Johnson had been unable to obtain grain of any sort, fowls, eggs, milk, or indeed anything. The people ate—and so did he for several days—wild herbs, mushrooms, and masuku,* which he calls an excellent fruit. This state of things is due to a raid of the Makwangwara last year, but prospects for the future were improving, as the harvests of Indian corn, &c., were nearly ready. About Christmas time, Mr. Johnson says, ulcers came on the backs of his hands, as he had dressed a number of bad ulcers daily, and the flies had carried the poison to him. Unfortunately just then his medicines came to an end, and therefore, as his health was evidently in a bad state from low diet, he resolved to go to Livingstonia for medicine. Accordingly he set out, and with some difficulty made his way over the unknown, hilly tract of country from Mwembe up to Makangila's; but, no doubt from ill-health, he has not yet furnished a detailed account of the journey to the lake-shore. Makangila, he says, gave him a guide to obtain for him provisions and canoes to take him a little way down the coast and then across to Livingstonia.

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* R. G. S. Journal, vol. xxxvii. p. 137.

Expedition of the Jesuit Missionaries to Umzila's Country.—Père Wehl, whose sudden disappearance, when Père Law's party were making their way along the Sabi river, was referred to in our May number,† has recently sent home an account of his separation from his companions and subsequent adventures. He mentions that the expedition had been five whole weeks on the journey from the Sepakwe to the Sabi, and had had to cross no less than twenty-four streams. It was on August 6th last year that he got separated from the waggon, owing, as he says, to its position having been suddenly changed without his knowledge. For eighteen hours he tried in vain to find it, and at last, losing all hope of rejoining his companions, he made up his mind to return to Gubuluwayo, as being his only chance of safety. After enduring great hardships for twenty-six days, he was met by four Kafirs, who took him by force to their village. At first he was treated with respect, but gradually their behaviour changed, and Père Wehl gathered that they intended to kill him on September 18th. On that very day, when he was awaiting death, Mr. Robert Roxby, of the Transvaal, who had heard of his capture, fortunately came to the rescue. Mr. Roxby promised to take him to Père Law, but circumstances, which are not explained, prevented the fulfilment of his promise, and Père Wehl had to continue his journey by himself. On October 28th, the fifth day after leaving Mr. Roxby, he reached the waggon, which, as we mentioned before, was abandoned by Père Law and the rest on August 10th. There he met Frère Desadeleer, who had been sent from Umzila's kraal to fetch it. The two started together, and after losing two oxen, contrived on December 2nd to reach Umgan, the first of Umzila's villages. The guides declared that the waggon could be taken no farther, and it was abandoned on December 17th. To add to the misfortunes of the little party, the rains set in, and brought them to a standstill at a poor village on the road. Eventually, however, Père Wehl arrived at Umzila's kraal on January 13th, having encountered Frère Hedley at a village on the road, where he had been detained by illness. About a fortnight apparently before his arrival, Père Wehl received news that Père Law had died on November 25th.—Augustus Henry Law was not a Fellow of our Society, but, as will have been gathered from our 'Proceedings' during the past twelve months, he was none the less active in the pursuit of geographical knowledge during his brief sojourn in South Africa. He was born on October 21st, 1833, and was the son of the Hon. and Rev. W. Towry Law, a younger brother of the late Earl of Ellenborough, Governor-General of India. The late Père Law was consequently a first cousin of our associate, Baron Ellenborough. He served for some time in the Royal Navy, but afterwards took orders in the Church of Rome, and laboured as a Jesuit missionary in Guiana. More recently he volunteered for the Zambesi expedition under Père Depelchin. Having met with several natives of Umzila's country, whilst in Matabeleland, and becoming interested in them, he formed a great desire to found a mission in that king's country, and in carrying out this object he lost his life. Mr. Law was a skilful draughtsman, and sent home a number of sketches of African life and scenery, some of which have been published in *Les Missions Catholiques.* Through the kindness of Sir Bartle Frere, we were enabled to give in our June number * last year the latitude and longitude of several places in Central South Africa which Mr. Law determined during his journey to Gubuluwayo.

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* In a letter received by the same mail from Zanzibar, Bishop Steere remarks:—

"Mr. Johnson mentions eating the *suku* fruit. I too ate it, when we were short of food; it is about as large as a small pear, only rounder, with a russet rind and three large grooved stones inside. The flesh is soft and melting, more like a pear than any other European fruit. The stones each contain a small plant fully formed, and with deep green leaves, which bursts its shell almost immediately that the fruit falls, which it always does as soon as it is ripe. It is an African custom to cut down a fruit-tree to get at the fruit, so the *suku* is wise, for if its fruit is on the tree, it cannot be fit to be eaten."

† See *ante*, p. 307.

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* See vol. ii. p. 367.

The Burke District of Northern Queensland.—Mr. Wm. E. Armit, F.L.S., has lately addressed to the Colonial Secretary at Brisbane a report respecting a large tract of country to the south of the Gulf of Carpentaria, or, to speak more precisely, the region between the Cloncurry and Towns' landing on the Leichhardt, and thence some 20 miles beyond Burdekin in the direction of Parker's Point, as well as that between the outlet of the Norman River and the Cloncurry.—The country for 60 miles north of the Cloncurry consists of ridges running out from the range and forming the watersheds between the Cloncurry, Williams, Dugald, and Leichhardt rivers. This tract is well timbered, and what is termed "second-class pastoral." On either side of the Leichhardt the country opens out, forming large plains and slightly rolling downs, which stretch for several miles from the river, and continue to within a few miles of the coast. This region, upwards of 200 miles in extent, has abundance of grass and water throughout, with a soil of fine red or brown loam of great depth. The timber, however, is poor, although fine gum-trees are met with near the coast. Mr. Armit believes that this region is never flooded in ordinary years. From the lower landing on the Leichhardt to Parker's Point the case is very different, from the fact that here the waters of the Gregory—previously kept back by a range running between it and the Leichhardt, which ends some 30 miles up the river—overflow and cover most of the plains on both banks. In this connection Mr. Armit calls attention to a fact which, he says, cannot be gleaned from the maps of Queensland. The Gregory, Barkly, Brook, and Nicholson rivers form one large drainage system, being, in fact, one river. The Barkly and Brook flow out, and uniting a few miles from Burketown, form the Albert river. The Gregory itself, flowing in a north-easterly direction, receives the waters of the Nicholson, and empties into the Gulf of Carpentaria near Point Tarrant. The Leichhardt is joined to the Albert river by a salt-water creek, called Policeman Creek, by which access is obtained to the Upper Leichhardt from the gulf, owing to the want of water on the bar of the Leichhardt. The country is very flat and intersected by chains of lagoons, which prove that it is subject to constant floods. The whole of this region is covered by a network of large and ever-running rivers, between which are open plains, with here and there a sandy ridge. A large body of water rushes down them from the table-lands in the rainy season, and the channels of the rivers being narrow are insufficient to drain it off. The country referred to is the best in the Burke district, and is identical with the Plains of Promise, discovered by Captain Stokes of H.M.S. *Beagle*, in 1841. The coast-line of the gulf is fringed by a belt of country, consisting of sand-ridges and salt-pans, which have been reclaimed from the sea by the rising of the coast.—The best and most useful of the rivers discharging into the Gulf of Carpentaria is the

Norman, which has a depth of from five and a half fathoms at its mouth to two fathoms at the Baffle Group landing, a distance of about 50 miles from Kimberley and only five from Normanton. Between this place and the Cloncurry, 250 miles distant, there is a perfectly level tract of country with abundance of grass and water, and but little timber, to which access is given by the Flinders, Saxby, and Cloncurry rivers. Owing to the shallowness of the river-basins in some parts, this region is, perhaps, more liable to floods than the Leichhardt country; but even here the inundations are only serious in excessively wet seasons.

THE ANNIVERSARY MEETING, MAY 23RD, 1881.

The Right Hon. LORD ABERDARE, President, in the Chair.

ELECTIONS.—*A. J. Burness, Esq.; William Alfred Browne, Esq.,* LL.D.; *Edward S. Delmege, Esq.; Joseph Ebenezer Day, Esq.; Colonel W. T. Goldsworthy; E. H. Harris, Esq.; Baron de Lühdorf; Lieut. William Usborne Moore,* R.N.; *Ebenezer Shoolbridge, Esq.; William Tebb, Esq.; Lieut. the Hon. Foley C. Vereker,* R.N.; *Francis Wagstaff, Esq.*

At the commencement of the proceedings, the Secretary, Mr. C. R. MARKHAM, read the clauses of the Regulations which govern the Annual General Meeting of the Society. The minutes of the previous Anniversary Meeting were then read and confirmed.

General Sir JAMES E. ALEXANDER, and Mr. J. W. MIERS, C.E., were appointed by the PRESIDENT to act as Scrutineers of the Ballot.

Mr. MARKHAM then read the Annual Report of the Council, as follows:—

REPORT OF THE COUNCIL.

The Council have the pleasure of laying before the Fellows the following Report on the financial and general condition of the Society:—

Members.—The number of Fellows elected during the past year (ending April 30th, 1881) was 168. In the previous year, 1879–80, the total elections of Fellows numbered 207; in 1878–9 the number was 187. The losses in the past year have been, by death 71, by resignation 52, and by default of subscription 32, making the net increase for the year, 13. In the year 1879–80 the net increase was 58; in 1878–9, 2; in 1877–8, 49. One Honorary Corresponding Member has been elected, and two lost by death, during the year.

Finance.—As will be seen by the annexed Balance Sheet, the total net income for the Financial year ending 31st December, 1880 (exclusive of balance in hand), was 8599*l.* 18*s.* 4*d.*, of which 6236*l.* consisted of entrance fees and subscriptions of Fellows. In the previous year, 1879, the total net income was 8979*l.* 14*s.* 10*d.*, including a legacy of 500*l.* from the late Sir W. C. Trevelyan, and the amount of subscriptions, &c., 6182*l.*; in 1878, 8124*l.* 10*s.* and 6017*l.*; in 1877, 7950*l.* 1*s.* 11*d.* and 6099*l.*; in 1876, 8611*l.* 11*s.* 8*d.* and 7109*l.* 11*s.*

The net expenditure for the past year (exclusive of investments and balance in hand) was 8454*l.* 1*s.* 10*d.*, including the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in 1879 and 1880. The net expenditure in 1879 was 6990*l.* 14*s.* 2*d.*; in 1878, 6361*l.* 9*s.* 6*d.*; in 1877, 5940*l.* 17*s.* 11*d.*; in 1876, 6870*l.* 13*s.* 1*d.*, and in 1875, 5683*l.* 4*s.* 10*d.* The sum of 1567*l.* 5*s.* 1*d.* was invested during the year.

The Finance Committee of the Council have held, as usual, Monthly Meetings during the year, supervising the accounts of the Society. The Annual Audit was held on the 20th and 22nd of April last, the Auditors being, on behalf of the Council, Sir Henry Barkly and R. N. Cust, Esq.; and on behalf of the Fellows at large, S. P. Low, Esq., and J. Duncan Thomson, Esq. The cordial thanks of the Council and Fellows are due to these gentlemen for having freely devoted their valuable time to this important task. At the end of their labours the Auditors drew up the following Report to the Council:—

"The Auditors appointed for the examination of the Accounts of the Royal Geographical Society for the year ending 31st December, 1880, beg to report that they have examined the Balance Sheet submitted to them, and compared it with the Cash Book, Bankers' Book, Petty Cash Book, 'Proceedings' Advertisement Books, and other books of account kept by the Society, and have verified the Balance in the Bankers' Pass Book and in the hands of the Accountant, checked the entries in the Cash Book, and examined all the vouchers for payments made, and that they have found the same to be correctly stated and sufficiently vouched.

"They have also had produced to them a letter from the Deputy Accountant of the Bank of England, and from Messrs. Cocks, Biddulph, and Co., Bankers, showing that the following investments were standing to the credit of the Society on the 31st December, 1880:—

	£	*s.*	*d.*
India 4 per cent. Stock	1000	0	0
India 4 per cent. Debenture Stock	2000	0	0
Great Western Railway 4½ per cent. Debenture Stock ..	1800	0	0
London and North-Western Railway 4 per cent. Debenture Stock	1000	0	0
North-Eastern Railway 4 per cent. Debenture Stock ..	1000	0	0
Great Indian Peninsula Railway Guaranteed 5 per cent. Capital Stock	4000	0	0
March Exchequer Bills	1000	0	0
Caledonian Railway 4 per cent. Preference Stock, No. 1	2000	0	0
Consols (Lambert Donation)	526	6	4
Consols	4214	0	6

"The Subscription Register, showing the sums payable by the Fellows of the Society, has been duly kept up, and the arrears outstanding at the close of the year were 1604*l.*, and the Auditors include this item in the assets of the Society as worth 802*l.*

"They regret to find that this amount is gradually increasing, but they trust this does not arise so much from an addition from annual default as from bringing forward long-standing arrears, and they recommend that, whenever practicable, all arrears of five years should be written off.

"The Investments and Assets of the Society on the 31st December, 1880, exclusive of the Map Collection and Library, amounted to 39,378*l.* 12*s.* 8*d.*

"The Auditors have pleasure in certifying that the accounts, books, and vouchers were in a highly satisfactory condition, and that no error was discovered or correction found necessary.

"HENRY BARKLY,
"ROBERT CUST,
"S. P. LOW,
"J. D. THOMSON,
} *Auditors.*

"23rd April, 1881."

Receipts. BALANCE SHEET FOR THE YEAR 1880. *Expenditure.*

1880.	£ s. d.	£ s. d.
Balance in Bankers' hands 31st Dec. 1879	1,435 17 6	
Do. Accountant's do.	21 16 11	1,457 14 5
Subscriptions:—		
For the current year ..	3,747 0 0	
Paid in advance	546 0 0	
Arrears	548 0 0	4,841 0 0
Entrance Fees	.. ..	501 0 0
Life Compositions	.. ..	894 0 0
Payments paid in error ..	.. ..	61 0 0
Parliamentary Grant ..	.. ..	500 0 0
Royal Premium	.. ..	52 10 0
Rent of Shop and Vaults	.. ..	140 0 0
Publications, Sale of, and Advertisements	.. ..	827 13 5
Payments for Scientific Instruction	.. ..	45 15 0
Dividends:		
North-Eastern Railway 4 per Cent. Debenture Stock .. .. 1000*l.*	39 3 4	
India Stock 1000*l.*	58 13 4	
India 4 per Cent. Debentures .. 2000*l.*	78 3 4	
Great Indian Peninsula Railway 5 per Cent. Stock .. 4000*l.*	207 11 8	
Great Western Railway 4½ per Cent. Debenture Stock (Davis Bequest) .. 1800*l.*	74 16 7	
London and North-Western Railway 4 per Cent. Debenture Stock (Murchison Bequest) 1000*l.*	39 2 6	
Exchequer Bills 1000*l.*	21 19 8	
Caledonian Railway 4 per Cent. Preference Stock .. 2000*l.*	78 4 6	
Consols 3669*l.* 2*s.* 2*d.*	107 15 8	
" (Back bequest) 561*l.* 0*s.* 8*d.*	16 9 6	
" (Trevelyan bequest 510*l.* 4*s.* 0*d.*	14 19 10	736 19 11
		£10,057 12 9

1880.	£ s. d.	£ s. d.
House:—Taxes and Insurances, Repairs, Improvements and Furniture, Coal, Gas and Water-rates, &c... ..	.. ..	263 9 10
Office: — Salaries and Gratuities, Stationery and Printing, Postages and Parcels, &c.	.. ..	1,529 9 5
Library:—		
Salaries, Books, &c. ..	.. ..	467 1 11
Map-Room:—		
Salaries and Gratuities, Maps, &c...	.. ..	1125 16 6
Meetings	.. ..	191 8 6
Scientific Purposes Grant:—		
Observatory, Instruction to Travellers, &c.	.. ..	358 15 0
Medals and other awards	.. ..	207 9 0
Publications:—Printing Journal and Proceedings, Maps and Illustrations, &c.	.. ..	3,197 11 8
Payments in error returned	.. ..	83 0 0
Investments:—		
Purchase of 1500*l.* India 4 per Cent. Debentures	.. ..	1,567 5 1
Expeditions:—		
Grants to the African Exploration Fund ..	.. ..	1000 0 0
Donations:—		
To the London Society for the Extension of University Teaching	.. ..	25 0 0
Do., to the George Long Memorial	.. ..	5 0 0
Balance in Bankers' hands 31st Dec. 1880 (excluding Draft not cashed)..	31 16 10	
Do. Accountant's Do.	4 9 0	10
		£10,057 12 9

REGINALD T. COCKS,
Treasurer.

Audited and found correct, the 22nd day of April, 1881.

HENRY BARKLY,
ROBERT CUST,
S. P. LOW,
J. D. THOMSON,
} *Auditors.*

STATEMENT showing the RECEIPTS and EXPENDITURE of the Society from the Year 1848 to the 31st Dec., 1880.

	Year.	Cash Receipts within the Year.			Cash Amounts invested in Funds.			Deducting Amounts invested in Funds; actual Expenditure.		
		£	s.	d.	£	s.	d.	£	s.	d.
	1848	696	10	5	..		..	755	6	1
In 1856 a Treasury Grant of 1000*l.* for the East African Expedition received.	1849	778	3	0	..		..	1,098	7	6
	1850	1,036	10	5	..		..	877	2	10
In 1860 a Treasury Grant of 2500*l.* for the East African Expedition received.	1851	1,056	11	8	..		..	906	14	7
	1852	1,220	3	4	..		..	995	13	1
	1853	1,917	2	6	..		..	1,675	6	0
In 1869 Legacy of Mr. Benjamin Oliveira, 1506*l.* 17*s.* 1*d.*	1854	2,565	7	8	..		..	2,197	19	3
	1855	2,584	7	0	..		..	2,636	3	1
In 1870 Legacy of Mr. Alfred Davis, 1800*l.*	1856	3,372	5	1	533	10	0	2,814	8	1
	1857	3,142	13	4	378	0	0	3,480	19	9
	1858	3,089	15	1	..		..	2,944	13	6
In 1871 Legacy of Sir Roderick Murchison, 1000*l.*	1859	3,471	11	8	950	0	0	3,423	3	9
	1860	6,449	12	1	466	17	6	5,406	3	7
In 1872 Amount of Mr. James Young's Grant for the Livingstone Congo Expedition, 2000*l.*	1861	4,792	12	9	1,358	2	6	3,074	7	4
	1862	4,659	7	9	1,389	7	6	3,095	19	4
	1863	5,256	9	3	1,837	10	0	3,655	4	0
	1864	4,977	8	6	1,796	5	0	3,647	7	10
In 1874 Amount of Mr. James Young's Grant for the Livingstone Congo Expedition, 1041*l.* 14*s.*	1865	4,905	8	3	1,041	5	0	4,307	4	5
	1866	5,085	8	3	1,028	15	0	4,052	15	0
	1867	5,462	7	11	1,029	0	6	3,943	17	4
In 1876 Special Parliamentary Grant of 3000*l.* towards the Expenses of the Cameron Expedition.	1868	5,991	4	0	1,857	3	9	4,156	17	10
	1869	6,859	16	0	2,131	5	0	4,646	0	8
	1870	8,042	6	1	3,802	6	0	3,845	10	6
	1871	6,637	3	7	1,000	0	0	3,726	4	4
In 1877 Donation of 500*l.* by Mr. C. J. Lambert in carrying out the provisions of his father's will.	1872	8,119	7	9	1,999	4	6	5,871	13	2
	1873	7,761	18	10	2,015	1	8	6,697	12	6
	1874	8,753	5	10	499	0	0	7,876	2	3
In 1878 Legacy of Admiral Sir George Back, 540*l.*	1875	7,934	15	10	2,002	7	6	5,683	4	10
	1876	11,611	11	8	..		..	6,870	13	1
	1877	7,950	1	11	2,538	2	0	8,940	17	11*
In 1879 Legacy of Sir W. C. Trevelyan, 500*l.*	1878	8,124	10	0	3,000	0	0	6,361	9	6
	1879	8,979	14	10	1,551	10	10	6,990	14	2
	1880	8,599	18	4	1,567	5	1	8,454	1	10†

* This sum includes the Special Parliamentary Grant transferred to the Cameron Expedition Fund in February, 1877.

† This amount includes the payment of two sums of 500*l.* each, contributed to the African Exploration Fund in this and the previous year.

STATEMENT OF ASSETS—31st December, 1880.

			£	s.	d.
Freehold House, Fittings, and Furniture, estimated (exclusive of Map Collections and Library insured for 10,000*l.*)		..	20,000	0	0
Investment (amount of Stock), as detailed in the above Report of the Auditors		..	18,540	6	10
Arrears due on December 31, 1880	£1,604				
Estimated at		.. .. ..	802	0	0
Balance at Bank (excluding Draft not cashed)		31 16 10			
,, in Accountant's hands		4 9 0			
			36	5	10
Total			£39,378	12	8

Publications.—The new monthly series of the 'Proceedings' has been continued with regularity since the last Report. The twelve numbers for the year 1880 contained 28 original papers, illustrated by 21 maps and 21 pictorial diagrams, besides the usual short geographical notices, reports of the evening meetings of the Society, proceedings of Foreign Societies, and lists, with analytical notices, of new books and maps. The 49th volume of the 'Journal' was published in September last, and the

50th volume is now nearly ready for issue. A general Index to the fourth ten volumes of the 'Journal,' which has been for some time in preparation, will be published immediately.

The fourth edition of the 'Hints to Travellers' being nearly out of print, a new edition has been decided on by the Council, and an Editing Committee, consisting of Colonel H. H. Godwin-Austen, Mr. Douglas W. Freshfield, and Mr. J. K. Laughton, appointed to superintend it, a sum of 100*l.* being placed at their disposal for the payment of a sub-editor.

Scientific Purposes Grant.—The sum of 358*l.* 15*s.* has been expended during the year, partly in the construction and fitting of the Observatory at the Society's house, and partly in the payment of half the fees for the instruction of intending travellers.

A report of the scientific instruction given to travellers in 1880 was published in the April number of the 'Proceedings'; since then three gentlemen (not mentioned in that report) have been instructed—their destinations being North Borneo, South-East Africa, and East Africa—making altogether twenty-five persons who have taken advantage of the Society's system of instruction since the date of the last Anniversary Meeting (as against twelve for the previous year), who are now at work in Asia, Africa, and America. The Observatory has been in constant use, not only by students but also by Fellows of the Society, who either wish to practise observing or to get their instruments adjusted, and has proved to be a most useful addition to the Society's building.

The large Map of Eastern Equatorial Africa, announced in previous years as in preparation by the well-known cartographer, Mr. Ravenstein, is now approaching completion. Three sheets out of the twenty-four of which it is to consist have been printed off, and the remainder will soon be ready for delivery. As announced in the Advertiser of the last number of the 'Proceedings,' Fellows may obtain copies of the whole twenty-four sheets, plain, on subscribing 12*s.* A bibliography of the authorities on which the Map is based, forming an octavo volume, is also being compiled by Mr. Ravenstein.

The grant of 25*l.* entered on the balance-sheet as made to the London Society for the extension of University Teaching, is to enable a Committee of that Society to prepare a series of original diagrams to facilitate the teaching and study of Physical Geography.

Expeditions: Grants of Instruments to Travellers.—Two grants of 500*l.* each were made during the year to the African Exploration Fund for the expense of the East African Expedition. The expedition completed its work in the course of last summer, and, as already announced in the 'Proceedings' for January of the present year, the Committee, with the approval of the Council, closed the fund, and the small balance which remained has since been expended in honorary rewards to the native followers of the expedition.

Instruments to the value of 318*l.* 15*s.* have been supplied to the following travellers:—Commander Malcolm Drummond, R.N., for work in Borneo (Sarawak), 76*l.* 10*s.*; Rev. W. G. Lawes, for his explorations in New Guinea, 52*l.*; Dr. Southon, for use in East Central Africa, 20*l.*; Miss Yule, for measurement of heights in Greece, 5*l.* 5*s.*; Mr. James Stewart, C.E., Lake Nyassa, 65*l.*; Mr. Joseph Thomson, East Africa, 100*l.* A case of instruments, at the cost of the Society, was sent to H.M. Consul at Loanda from the Meteorological Office, value 11*l.*, but unfortunately they were all broken in transit. The following instruments have been returned into stock:—Those supplied to the late Mr. Keith Johnston, Mr. Delmar Morgan, Surgeon-Major Aitchison. Some of the above are out of repair and broken, and one watch has been left with Dr. Kirk, H.M. Consul-General at Zanzibar.

Library.—582 books and pamphlets have been added during the past year; 480 (including all the pamphlets) by donation or exchange, and 102 by purchase. Presentation of new works by publishers, with the object of obtaining notice in the bibliography of our 'Proceedings,' continues to be made.

79 pamphlets and small works have been put into covers on the Society's premises, and 235 volumes have been bound.

The sum of 75*l.* 0*s.* 10*d.* has been expended in purchasing books, and the further sum of 63*l.* 7*s.* 3*d.* in binding for the Library.

Among the more important accessions are:—The description and voluminous pictorial representations of Bôrô-Boedoer, Java (presented by the Netherlands Government, through Professor P. J. Veth, to whom also the Library is indebted for the commencement of 'Midden-Sumatra,' the comprehensive account of the recent Dutch expedition to that island); Gazetteers of Rajputana and British Burma, continuations of the accounts of the operations, reports, &c., of the Trigonometrical, Topographical, and Revenue Surveys of India, and of Professor Max Müller's 'Sacred Books of the East,' the commencement of Major Raverty's 'Notes on Afghánistán,' Major Biddulph's 'Tribes of the Hindu Koosh,' and other minor publications (presented by H.M. Secretary of State for India); the continuation of the Memoirs and Records of the Geological Survey of India (presented by the Indian Government, through Dr. Oldham); the continuation of the princely work 'Die Balearen,' and 'Karawanen Strasse' (presented by the Archduke Ludwig Salvator of Austria); the continuation of the costly 'Journal du Muséum Godeffroy'; Müller's 'Geographici Græci Minores,' and 'Fragmenta'; vols. xi. and xii. of the 9th edition of the 'Encyclopædia Britannica' (presented by Messrs. A. and C. Black); various publications of the United States Surveys (presented by the Government through Professors Hayden and Whitney and Lieutenant Wheeler); Lejean's 'Voyage aux deux Nils,' with Atlas; the completion of Ujfalvy's 'Expédition Scientifique française,' and Madame Ujfalvy's 'De Paris à Samarkand'; Lasaulx's 'Aetna'; Fergusson and Burgess's 'Cave Temples of India' (presented by Mr. J. Fergusson); Fergusson's 'History of Architecture'; Gordon's 'Report on the Irrawaddy' (presented by the Author); Schliemann's 'Ilios'; Lady Anne Blunt's 'Pilgrimage to Nejd,' and Baness's 'Index Geographicus Indicus' (presented by the respective Authors); Major Serpa Pinto's 'How I Crossed Africa'; Dr. Holub's 'Seven Years in South Africa' (presented by the Publishers); Lumsden's 'Mission to Kandahar' presented by Mr. C. R. Markham); Freeman's 'Historical Geography of Europe'; Guimet and Régamey's 'Promenades Japonaises'; Mrs. Hutchinson's translations of Pigafetta's 'Congo' presented by the Translator and by Sir Fowell Buxton); Wild's 'Temperatur Verhältnisse des Russischen Reiches,' with Atlas; and the continuation of Burmeister's 'Description physique de la République Argentine' (presented by the Authors); the 'Account of the Draining of Lake Fucino, with Atlas (presented by H.E. Prince A. Torlonia); and all the recent editions of Murray's Handbooks.

The second Supplement to the Alphabetical Catalogue has been completed in MS., and is now in the printer's hands; it includes the additions to the end of 1880, and will be ready for delivery early in the ensuing Session.

The Library continues to be largely consulted, both by Fellows and visitors introduced by them, and applications for information are constantly made to the Librarian by letter; but its capabilities are not utilised in proportion to its development.

Map Room.—The accessions to the Map-Room Collection since the last Anniversary Meeting comprise 1288 Maps and Charts on 2513 sheets; 17 Atlases, containing 1073 sheets of Maps, and 139 Photographs and Views. Of these, 22 Maps on 676 sheets, 5 Atlases, and 42 Views have been purchased. The accessions of the present year are in excess of those of last year by 596 Maps on 728 sheets, and 5 Atlases.

Among the most important donations to the Map-Room Collection are:—206 Sheets of the Ordnance Survey of the British Isles, on various scales (presented by the First Commissioner of Works, through the Director-General of the Ordnance Survey). 105 Charts of British Admiralty (presented by the Lords Commissioners of the Admiralty, through the Hydrographer). 9 Sheets of Maps (presented by the Intelligence Branch of the Quartermaster-General's Department). 45 French Admiralty Charts (presented by the Depôt des Cartes et Plans de la Marine). 21 Sheets of United States Charts (presented by Captain J. C. P. de Krafft, U.S.N., Hydrographer to the Bureau of Navigation). 29 Charts of the Indian Marine Survey (presented by the Superintendent of the Survey). 343 Sheets of the various Indian Government Surveys (presented by H.M. Secretary of State for India). A collection of all the principal Maps and Plans published by the late Ph. Van der Maelen (presented by his relatives). Parts XII. to XXV. of the new edition of Stieler's Hand Atlas (presented by Herr Justus Perthes). 3 Parts, each containing 12 Maps, of the 'Topographischer Atlas der Schweiz' (presented by the Chief of the Federal Survey, Berne). 23 Maps published in Petermann's 'Mittheilungen' (presented by Dr. E. Behm). 22 Sheets of various Government Surveys of Sweden (presented by the Chief of the General Staff, Topographical Department, Stockholm). 12 Sheets of Government Surveys of Norway (presented by Col. Fr. Sejersted). 49 Maps of portions of British North America (presented by A. Russell, Surveyor-General of Dominion Lands). 18 Maps of Sierra Leone and adjacent country (presented by H.M. Secretary of State for the Colonies). Map of Western Palestine, scale 1 mile to an inch (presented by the Rev. F. W. Holland). Statistical Atlas of England, Scotland, and Ireland (presented by Messrs. W. and A. K. Johnston).

The Maps in the Society's Collection have been made frequent use of by Fellows, public officers, and the general public; and the large Maps have been lent for the purposes of illustrating lectures at public institutions, as well as to private individuals. Eight new Diagrams have been constructed on the premises.

The new Catalogue of Maps is in the printer's hands, and will soon be completed.

Lord Cottesloe moved the adoption of the above Report. He said that he had enjoyed the honour and privilege of being a member of the Council for a great many years, but twelve months ago he ceased to be so; he was therefore entirely disinterested in expressing his approval of the statement regarding the financial and general condition of their affairs to which they had listened. He could not recollect any period at which the Society was in a more flourishing condition than at the present moment, and he hoped it would long continue so. The financial position of the Society was very satisfactory, and those who had known it in its early days would be most delighted to find that a property had been acquired which would realise 20,000*l.*

Captain Peacock seconded the motion, which was agreed to.

PRESENTATION OF THE ROYAL MEDALS.

The President said it was now his pleasing duty to announce the names of the gentlemen who, as the most distinguished among many distinguished travellers, had been selected for the award of the highest honours which the Society could confer, namely, the two Royal Medals for the Encouragement of Geographical Science and Discovery.

The Medals had been awarded by the Council as follows:—

The Founder's Medal to Major Serpa Pinto, for his remarkable journey across Africa, from Benguela to Natal, during which he explored nearly 500 miles of new country, defined the fluvial systems of the southern slopes of the Benguelan Highlands, and fixed the position of numerous places by a series of astronomical observations; also for the admirable account of his journey, published in London, containing numerous original maps, tables of observations, and a large amount of valuable and exact information regarding the African interior.

The Patron's Medal to Mr. Benjamin Leigh Smith, for having, in a steamer built and fitted at his own expense, for the purpose of Arctic exploration, made important discoveries along the south coast of Franz-Josef Land; and for his previous geographical work during three former expeditions, also equipped by himself, along the north-east land of Spitzbergen.

The fortunate and worthy recipient of the Founder's Medal, Major Serpa Pinto, was not present, and the Portuguese Minister had requested him (the President) to express his regret that being obliged to attend the levée, he was unable to appear before the Meeting and accept the medal as Major Serpa Pinto's representative. But he was happy to say that the gentleman who would take his place, Captain da Fonseca Vaz, was in all respects fit to represent the enterprise of his country, he being an officer in the Portuguese navy who had done much to make known the course of the Zambesi, and had prepared charts which competent authorities had pronounced to be admirable. He (the President) had read to them the brief statement of the Council with regard to the services of the Medallist, but Major Serpa Pinto's book must be read before any one could fully appreciate the wonderful courage, the resource, the endurance, the fortitude, and the patience exhibited by this most remarkable man, which enabled him to overcome trials and difficulties which had never been surpassed in the career of any traveller. In addition to this, Major Serpa Pinto had fully qualified himself to be a scientific geographer. He was not simply one of those daring men who had traversed a difficult and dangerous region, thereby no doubt performing service to society, but he had taken observations and made a serious contribution to the science of exact geography. It gave him (the President) peculiar pleasure that the winner of the medal was a Portuguese. Major Serpa Pinto was the first Portuguese who had won it, but no doubt it would not be long before others of his countrymen would be in the front rank of aspirants for it, and it would not be at all surprising if Captain da Fonseca Vaz himself obtained the honour. He was pleased to find a Portuguese receiving the medal, not simply because Portugal had long been the friendly ally of England, for if that country had been our consistent adversary he hoped that the Society had sufficient impartiality to assign the medal to the most distinguished traveller whatever country he belonged to; but he had peculiar pleasure in bestowing the medal on a countryman of the great Prince Henry, who perhaps more than any other man in modern times had contributed to the advance of real discovery and scientific geography, to the countryman of Vasco da Gama, Magellan, and many other illustrious men who had made known the most distant regions of the world. He was therefore rejoiced to see Portugal, which once stood at the very head of maritime discovery, again asserting her claims to distinction in the person of Major Serpa Pinto, and he had peculiar satisfaction in presenting the medal which had been so worthily won.

Captain DA FONSECA VAZ, in accepting the medal on behalf of Major Serpa Pinto, expressed the regret of his Excellency the Portuguese Minister at not being able to be present to receive the medal. He himself felt highly honoured in having been appointed by his Excellency to represent him. He was sure he was only expressing the feelings of his friend Major Serpa Pinto when he assured the Meeting of his most deep sense of gratitude for the great honour conferred upon him by the Royal Geographical Society as an acknowledgment of his discoveries. The very favourable criticisms by the English press on his book showed that it had been very favourably appreciated in this country. Last year, at the meeting of the British Association at Swansea, the opportunity was afforded of understanding the work of two distinguished Portuguese officers, Captain Capello and Lieutenant Ivens, who with Major Serpa Pinto formed the scientific *personnel* of the expedition, which was entirely paid for by the Portuguese Government and carried through under their control and that of the Royal Geographical Society of Lisbon. These facts, together with many others, showed what efforts the Portuguese Government had been making for some years past to join heartily in the development of civilisation in Africa and of geographical knowledge there. The Royal Geographical Society in Lisbon was a very modern institution comparatively speaking, but since its beginning it had been working hard and doing very good service. Just now a scheme was on foot in Portugal, under the auspices of the Minister of Marine, to form four great stations in Central Africa under the Portuguese flag. Those stations were intended as centres from which civilisation in all its different forms might radiate, and exploration of the surrounding districts carried on. The President had been kind enough to allude personally to him (Captain da Fonseca Vaz), and he begged to express his very hearty thanks for the kind remarks that had been passed upon him. A few years ago he was in command of a gunboat that he took from Glasgow, where she was built, to the east coast of Africa through the Suez Canal and up the Zambesi. There he took many observations at the cost of many fevers, and made sketches which enabled him on his return to construct a map of the Zambesi from the Indian Ocean to a little above Tete, a distance of 300 miles, just stopping short of the lower Falls. That map he had the honour of offering to the Royal Geographical Society a few days ago. When going up the river, at a beautiful spot called Chupanga, on the right bank and under the shade of a huge *baobab*, he came across the grave of Mrs. Livingstone, that distinguished woman who was an honour to her sex and her countrywomen; and he remembered it was with a sort of religious feeling that they had the grave cleared all round and the huge wooden cross repaired. That cross, symbol of love and peace, respected by negroes and whites, might be taken as a warning, or, better, as an advice to all comers. The portion of Africa which had still to be rescued from barbarism was enormous, large enough for all, and every one who went there should be animated by a real love of peace and a sincere desire to develop civilisation in all its forms, and not by a small spirit of exclusiveness, which might sometimes, though unjustly, be attributed to some powerful nations. He would take care that the medal should soon reach the hands of its fortunate and rightful possessor.

The PRESIDENT said the Patron's Medal, which was of equal value and importance with the Founder's, had been conferred upon Mr. Benjamin Leigh Smith. He very much regretted that that gentleman was not present to receive it himself; but Mr. Clements Markham, who on a recent occasion read a paper giving an account of Mr. Smith's expedition to Franz-Josef Island, would receive it in his stead. Mr. Benjamin Leigh Smith was a very remarkable man, representing in himself many of the best qualities of those who had made the naval fame of England. At the University of Cambridge he acquired a profound knowledge of mathematics. Afterwards he applied himself to the practical knowledge of navigation, and in three successive voyages explored Spitzbergen and its neighbourhood in vessels fitted out and maintained at his own cost. His fourth voyage, however, was the most remarkable, because he carried upwards of a hundred miles further our knowledge of that recently discovered land, Franz-Josef Land, and laid open a route which might perhaps be destined to conduct explorers nearer to the Pole than had been yet accomplished by any other route. In addition to his attainments as a sailor he had a remarkable degree of modesty. The Society would gladly have heard from his own lips an account of his adventures, but he had written to say that he was at the present moment engaged at Peterhead in fitting out a ship for a fifth voyage of exploration, which he hoped would carry him still further in the direction of those mysterious regions which so many nations had in vain endeavoured to reach. In his absence the medal would be received by Mr. Clements Markham, who was one of the most zealous encouragers of scientific exploration.

Mr. Clements R. Markham said that in receiving this medal for his friend, Mr. Leigh Smith, it was his duty to express, in that gentleman's name, his great regret at his unavoidable absence. No doubt the Meeting would take it as a sufficient excuse that Mr. Leigh Smith was at Peterhead fitting out a new expedition. The honour of receiving the medal had been as gratifying as surprising to Mr. Smith, for he had not the least expectation of anything of the kind. Hitherto he had continued his explorations solely for his own pleasure and the love of adventure, but no doubt the medal would give him a fresh incentive to further geographical work.

Public Schools' Prize Medals.*

Mr. H. N. Moseley read the award of the examiners:—

Physical Geography (*Examiner*, H. N. Moseley, Esq., M.A., F.R.S.).—*Gold Medal*—Robert Galbraith Reid, Dulwich College. *Silver Medal*—Sydney Edkins, City of London School. *Honourably Mentioned*—Montague Edward Fordham, London International College; William Lutley Sclater, Winchester College, and Henderson M'Master, Liverpool College (equal); Alfred Daniel Hall, Manchester Grammar School.

Political Geography (*Examiner*, The Right Rev. Bishop Abraham).—*Gold Medal*—Theodore Brooks, London International College. *Silver Medal*—Charles Theodor Knaus, Dulwich College. *Honourably Mentioned*—Henri Rüffer, Dulwich College; Adrian Knox, Harrow School; Albert Lewis Humphries, Liverpool College; William Queneborough Wright, London International College.

The President having presented the medals to the boys,

Mr. Francis Galton said it was a matter of congratulation that this year as formerly the medals were awarded to candidates well worthy of them, and he could not do better than read a few lines in which that view was forcibly expressed by Mr. Moseley, the examiner in Physical Geography, who was so well known to the scientific world as a member of the *Challenger* Expedition. He says, "It is indeed a matter of the highest satisfaction that, in a country which has no representative professors of any branch of geography in any one of its universities, and in most of the schools of which the subject is practically neglected, certain schools should be induced to turn out, at ages of sixteen or seventeen, boys showing so intelligent a proficiency in the subject as those successful in the present examination." There could be no doubt as to the stimulus afforded by these medals to the teaching of geography in at least some of the public schools. It was the desire of the Geographical Prize Committee to harmonise their programme with the requirements of the teaching in public schools, but it was difficult to do so, because the art of teaching geography was still in process of formation. The head masters of the schools whose candidates had been the most successful, were themselves somewhat disagreed as to the best way of teaching; and the programme of the Committee in the future, as in the past, was obliged to be to some extent a compromise. In the coming year there would be some reform. The examiners would hereafter be appointed for a longer period, the terms for which they held office being so arranged that they would overlap. In this way a tradition as to the conduct of the examinations would gradually arise. In future, too, the examiners would be conjoined in setting the questions and in deciding upon the merits of each paper, and the special subjects would be more limited. The subject for next year would be Australia (excluding Tasmania).

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* The other educational medals, placed at the disposal of the syndicates respectively of the Oxford and Cambridge Local Examinations, were awarded as follows:—

1880. Oxford (June).—*Silver Medal*—George Wightman Powers. *Bronze Medal*—Thomas Coke Hillard.

Cambridge (December).—*Silver Medal*—(Physical Geography)—George Frederick Tinney, Park Grammar School, Plymouth. *Silver Medal* (Political Geography)—Frederick George Harris, Elmfield College, York.

The ballot for the members of Council for 1881–2 then took place. The result was announced by Sir James Alexander (one of the scrutineers) as follows; the whole of the list recommended by Council having been elected.

President: Right Hon. Lord Aberdare, F.R.S. *Vice-Presidents:* Sir Rutherford Alcock, K.C.B.; Major-General Sir H. C. Rawlinson, K.C.B.; Sir Henry Barkly, G.C.M.G., K.C.B.; Sir Barrow H. Ellis, K.C.S.I.; Francis Galton, Esq., F.R.S.; *R. H. Major, Esq.*, F.S.A. *Treasurer:* Reginald T. Cocks, Esq. *Trustees:* Lord Houghton, D.C.L., F.R.S.; Sir John Lubbock, Bart., F.R.S. *Secretaries:* Clements R. Markham, Esq., C.B., F.R.S.; *D. W. Freshfield, Esq. Foreign Secretary: Lord Reay. Councillors:* John Ball, Esq., F.R.S.; Sir T. Fowell Buxton, Bart.; *Right Hon. Lord Cottesloe; Captain F. J. O. Evans*, R.N., C.B., F.R.S.; James Fergusson, Esq., F.R.S.; *Right Hon. Sir H. Bartle E. Frere, Bart.*, G.C.B., G.C.S.I.; Colonel H. H. Godwin-Austen, F.R.S.; *Colonel J. A. Grant*, C.B., C.S.I., F.R.S.; J. K. Laughton, Esq.; *S. P. Low, Esq.;* Captain Sir G. S. Nares, R.N., K.C.B.; Admiral Sir Erasmus Ommanney, C.B., F.R.S.; Colonel Sir Lewis Pelly, K.C.B., K.C.S.I.; Major-General C. P. Rigby; *Major-General A. L. F. Pitt-Rivers*, F.R.S.; *Lord Arthur Russell*, M.P.; General R. Strachey, R.E., C.S.I., F.R.S.; Sir Richard Temple, Bart., G.C.S.I.; Major-General Sir H. L. Thuillier, C.S.I., F.R.S.; Sir Harry C. Verney, Bart., M.P.; *Colonel Henry Yule*, C.B.

Sir ARTHUR PHAYRE moved a vote of thanks to the retiring members of Council, the Committees, Auditors, and Scrutineers, for their services during the past year.

Mr. J. B. REDMAN, C.E., seconded the motion, which was agreed to.

The meeting then terminated.

THE ANNIVERSARY DINNER.

The usual annual dinner of the Fellows of the Society and their friends took place in the evening of the same day, at Willis's Rooms, St. James's. The chair was occupied by the Right Hon. LORD ABERDARE, the President.

Among the distinguished guests and members present were:—H.E. Count Munster, German Ambassador; H.E. Count Menabrea, Italian Ambassador; H.E. the Hon. J. Russell Lowell, American Minister; H.E. Senhor Martins d'Antas, Portuguese Minister; H.E. Baron Solvyns, Belgian Minister; H.E. Count Bylandt, Netherlands Minister; Captain Palander; Captain P. da Fonseca Vaz; Sir Joseph D. Hooker; Professor Tyndall; W. Spottiswoode (President of the Royal Society); the Earl of Northbrook; Lord Tenterden; Lord Houghton; Lord Cottesloe; the Right Hon. M. E. Grant Duff, M.P.; the Right Hon. Sir Bartle Frere, Bart.; Sir Richard Temple, Bart.; Sir Fowell Buxton, Bart.; Major-General Sir H. C. Rawlinson, K.C.B.; Sir Rutherford Alcock, K.C.B.; Sir George F. Bowen; Sir Barrow H. Ellis; Sir Arthur Phayre; Sir H. E. L. Thuillier; Sir F. J. Evans, R.N., K.C.B.; Mr. Paul B. Du Chaillu; Colonel J. A. Grant; Rev. Dr. Carver; Admiral A. H. Hoskins; Colonel C. E. Stewart; Mr. R. N. Cust, &c., &c.

The toasts were:—1. "Her Majesty the Queen, Patron of the Society";

2. "H.R.H. the Prince of Wales, Vice-Patron, H.R.H. the Duke of Edinburgh, Honorary President of the Society, and the rest of the Royal Family"; 3. "The Medallists of the year." In proposing this toast, the President coupled with it the name of the Minister for Portugal, on account of Major Serpa Pinto, to whom had that day been publicly accorded the Founder's Royal Medal for 1881: he expressed his gratification that a Portuguese had carried off one of the chief prizes, for there was perhaps no country to which geographers ought to feel more grateful than to Portugal. The other distinguished recipient of a similar honour, that of the Patron's medal for the year, Mr. Leigh Smith, was unfortunately not present at that gathering, being engaged at Peterhead in fitting out his yacht for a further cruise this summer. The Portuguese Minister (who responded to the toast in French) said that perhaps for the first time in his life he felt deep regret at not being an eloquent orator, to tell them how sensible he was of the kind words of Lord Aberdare, and of the honour which the Geographical Society had accorded to Major Serpa Pinto, in conferring upon him the gold medal. The Geographical Society had once more given noble proof of its desire to reward those enterprises for the conduct of which there is need of the utmost amount of bravery, aptitude, and ability. The honour accorded to Major Serpa Pinto was reflected on the country to which he belonged, and upon the representative who now found himself among them. He thanked them simply but sincerely. 4. "Our Foreign Guests," proposed by Lord Houghton; responded to by H.E. Count Munster, the German Ambassador. And lastly, 5. "Lord Aberdare, President of the Society," proposed by the Hon. J. Russell Lowell, American Minister, who spoke as follows:—"I am a little surprised to find myself addressing the Geographical Society, or at least I find it a little difficult to explain by what right I am addressing you, since I owe my presence here to a very pardonable, but very clear imperfection of geographical knowledge, which led a celebrated Italian, in seeking for the back door of Asia, to open the front door of America; to that happy accident I owe the only distinction which entitles me to be present in so illustrious a company. After the hint of my colleague, the Ambassador of Germany, I certainly shall not detain you long; for if there is anything that a Geographical Society should respect it is boundaries, and surely the boundary of an after-dinner speech should be very accurately defined. It is my agreeable duty to-night to speak to a toast on which I need not dilate, and which requires no eloquence on my part to enforce, but which will carry your sympathies with it. I have not been honoured long with the acquaintance of your noble President, but his is a character so manly and so open that it is seen at once. It is a character which will wear well, and which we are sure to find ten or twenty years hence precisely what we know it to be. It is a difficult thing for a stranger to speak precisely to the kind of toast which I am about to propose. You will all understand this difficulty, and will bear with my imperfections and pardon them. The English tongue lends itself reluctantly to the praise of anybody to his face. He does not wish it, nor does he need it; but to a stranger, thinking what could be said without trenching upon delicacy, it seems to me that if there were any felicity which approached that of being born an American, without being too onerously handicapped with the past, it would be the felicity of being born an English gentleman, who owns his debts to the past, recognises his obligations to the present, and is ready always to do his duty whether in public office or as a private citizen. Our President combines in himself two characteristics which cannot fail to be interesting to every man who speaks English and who claims English blood—something, I think, eminently characteristic of English gentlemen—I mean that combination of thorough classical training with love of manly field sports which has averted from the English race the ordinary consequences of too prolonged material prosperity, and which has kept

alive in them those qualities which made them and which keep them what they are. I have the honour to offer to you 'The Health of our President.'"

The toast was drunk with great heartiness, and a few words of acknowledgment from Lord Aberdare brought the proceedings to a close.

REPORT OF THE EVENING MEETINGS, SESSION 1880-81.

Thirteenth Meeting, 13*th June*, 1881.—The Right Hon. Lord ABERDARE, President, in the Chair.

ELECTIONS.—*The Rev. W. Boyce; Lieut.-Colonel Arthur C. W. Crookshank; John Coutts Fowlie, Esq.; Thomas Greer, Esq.*, M.P.; *Lord Kesteven; William Clarence Watson, Esq.; Captain John Thomas Wright*, R.E.

The subject of the evening was a paper by Mr. E. Colborne Baber (Chinese Secretary of Legation, Peking), entitled—

"A Journey of Exploration in Western Sze-chuen."

The paper, in the absence of the author, was read by Captain W. Gill, R.E. It will be published, with the author's maps and illustrations, as Part I. of the new Supplement to the monthly 'Proceedings.'

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—May 20th, 1881: M. DAUBRÉE, of the Institute, in the Chair.—In an address which was received with much applause, the Chairman recounted the services rendered by the late Admiral Le Baron de La Roncière-le Noury to the Society, of which he became President in 1873 in succession to M. Chasseloup-Laubat. He dwelt upon his constant and zealous endeavours for the development of the Society, and upon the promptitude with which he accepted the idea of holding the second International Congress of Geographers at Paris at the particular time at which it took place, as well as upon the active influence which he exercised in connection with the construction of the Society's new building.—M. Bouquet de la Grye thanked the Chairman in the name of the family of the deceased for the tribute of respect which he had paid to the memory of the late Admiral.—Telegrams from several Geographical Societies expressed the regret which was felt in various parts at the loss sustained by the Society.—The General Secretary, M. Maunoir, presented the manuscript map of Indo-China which M. Dutreuil de Rhins has just finished after five years' labour, and expressed a wish that this remarkable work, which had such an important bearing on the progress of French colonisation in the countries of the Far East, might have an extensive circulation.—Dr. Hamy afterwards furnished some information respecting the recent expedition of M. Désiré Charnay in Yucatan.—It was reported that some information had reached the Society respecting the journey of Dr. Bayol in the valley of the Rio Nunez. He hoped to start for the interior in the middle of May, and to push on so as to reach Timbo before the roads have been made impracticable by the rains which commence towards the end of April.—A letter was read from the French Consul at Zanzibar, announcing that M. Bloyet had inaugurated on February 13th the station of the French Branch of the International African Association at Kondoa, and was anxiously awaiting the arrival of a naturalist and a carpenter.

——— June 3rd, 1881: M. DAUBRÉE, of the Institute, in the Chair.—Among the maps exhibited at the meeting were the seventeen sheets of the new part of the Government map of France on the scale of 1 : 100,000, of which sixty-seven sheets are now published. Hitherto the inequalities of the surface have not been shown, but the Minister of the Interior has decided that they shall be given in future, and this has accordingly been done on seven of the sheets in the present part.—A letter was read from M. Ledoulx, French Consul at Zanzibar, communicated by the Minister for Foreign Affairs, announcing that Herr Schöler, the head of the German expedition, which started at the same time as the third Belgian expedition, had returned to Zanzibar, after founding a station at Kikoma on the road to Lake Tanganyika. M. Ledoulx also reported the arrival at Zanzibar, by the last mail from Europe, of the commission which is on its way to the Zambesi to investigate the mineral, commercial, and other resources of Senhor Paiva's concession. This commission is composed of four civil engineers, a chemist, and a surgeon (all French), and is under the direction of Captain J. d'Andrada, Portuguese military attaché at Paris. The Marquis de Gourgues had arrived by the previous mail on his way to the Zambesi for the second time in order to facilitate the carrying out of the investigations of the commission. M. Ledoulx has further sent to the Society some information respecting the tsetse fly, and he mentions that Dr. Kirk, her Majesty's Agent and Consul-General, is preparing a work on the insect, which he considers one of the most serious impediments to the civilisation of Africa.—M. Romanet du Caillaud informed the Society that the Abbé Lesserteur had written a pamphlet on '*Hwang-nan*,' which is used in Tongking as a cure for hydrophobia, leprosy, &c., and which is classed by M. Pierre, of Saigon, among strychnias. It is thought that it will prove most useful for explorers in hot countries, as instances are cited of its curing snake-bites.—A memorandum by M. Boulangier was afterwards read on the geography, &c., of Cambodia and Siam.—The Chairman alluded to the presence of M. Lemyre de Villers, the Governor of French Cochin-China, and thanked him for all that he had done for the promotion of scientific studies in that colony. M. Lemyre de Villers replied that he considered geography and the kindred studies indispensable for the political direction of a new country, citing in support of his view the practice of the English in similar cases. He again placed himself at the disposal of the Society, and promised to facilitate the researches of all travellers whom they might recommend to him. Personally, he said, he should look upon them as his fellow-labourers and friends—a sentiment which was received with loud applause.—M. de Lesseps appealed to the Society to support the work of the International African Association, and reminded them of the good work which it had already done.—General Türr announced that he had just obtained the concession for the construction of a canal through the Isthmus of Corinth, and he made some observations upon the economic advantages of the enterprise.—Dr. Harmand furnished a *résumé* of a journey, which had just been accomplished by Dr. Neis, a naval surgeon, in the north-east of the French possessions in Indo-China. The explorer had made a complete reconnaissance of the Dong-nai, the source of which he placed in 12° 30′ N. lat., 108° 25′ 15″ long. east of Greenwich.—M. de Quatrefages gave some details of Dr. Montano's journey in Malaysia and the Philippine Islands, and announced the early return to Europe of this distinguished traveller.—The Chairman stated the principal results of the journey of MM. Brau de St. Pol Lias and de la Croix in Sumatra and the Malay Peninsula, where they have accumulated much information and made some interesting collections. During his stay of seven months in Perak, M. de la Croix made a geological survey of upwards of 120 miles of the country, which is of interest from the tin deposits found there.—The Chairman presented a gun, as a gift from the Society, to Apatou, Dr. Crevaux' black follower during his several journeys in Equatorial America.—M. de Lesseps next described Major Roudaire's recent investigations in connection with his project for an interior sea in Southern Algeria.—Lastly, M. Paul Soleillet explained the political and economic condition of the kingdom of Segou on the Niger, as well as his own views as to the mode of action to be adopted in this part of Africa. He also called attention to the peculiarities which distinguish the Bambarras from the other black tribes of this region.

Geographical Society of Berlin.—Meeting of representatives of German Geographical Institutions, June 7th and 8th, 1881: Dr. NACHTIGAL, President, in the Chair.—This meeting was the first of the united gatherings arranged in conformity with a pre-arranged plan of co-operation among cultivators of geography throughout Germany. It comprised not only geographical representatives from six German Universities, but many teachers and friends of the geographical sciences. In his opening speech to the assembly the President gave a *résumé* of the attempts that had been made in recent times to establish a central point for the various Geographical Societies of Germany, which at present had a total of 4000 members, and thus to give collective force to their scientific efforts without depriving them of their independence. It was intended that the governing body of this Union should be at Berlin, and that the 'Zeitschrift,' published by the Berlin Geographical Society, should be the general organ, its size and the number of its maps being proportionately increased. This scheme of centralisation had met, however, with invincible opposition on the part of the delegates of the various Societies, who thought the interests of their constituents would be prejudiced by such an arrangement, and the idea had therefore to be given up. Instead of it, the institution of voluntary annual meetings of the friends of geography was resolved upon as a means of satisfying the same want, viz. common action on the part of the geographers of Germany. In these annual congresses it was intended that scientific papers and discussions of important geographical questions should form the groundwork of the meetings.—The papers read during the two days the Congress lasted were—1. On the Ways and Means of Investigating the Condition of the Earth's Centre, by Professor Zöppritz (Professor of Geography at the University of Königsberg); 2. On the Bermudas and their Coral Reefs, by Professor Rein (Professor of Geography at the University of Marburg), founded on observations made by the author during a two years' residence on the islands; 3. On the importance of Magnetic Researches, from the point of view of Geography and the Study of the Earth generally, by Dr. Neumeyer (Director of the Imperial German Marine Observatory at Hamburg); 4. On the Claims of Ethnography, by Dr. Bastian (Director of the Ethnographical Museum at Berlin); 5. On the Forms of German Houses viewed Geographically and Historically, by Professor Meitzen (Professor of Statistics at the University of Berlin); 6. On the Results of earlier Travels with regard to the Botany of Tripoli and the Libyan Desert, by Professor Ascherson (Professor of Botany at the University of Berlin). At the afternoon meeting there was an animated discussion on the subject of Geography at Schools, commenced by Professor Kirschoff (of Halle), who made some general remarks on the present condition of geographical teaching in Germany. He described the geographical teaching at the higher educational institutions as extremely defective, the result of which was that gross ignorance of geographical subjects prevailed among the majority of students of the upper classes. The fault of this was chiefly attributable to the combination of historical with geographical teaching, whereby teachers, although well grounded in history, attempt to make pupils acquainted with a subject of which they themselves have very insufficient knowledge; the time allowed for the lessons was also too limited. The Meeting unanimously agreed with the speaker, and passed the following resolutions:—"That a combination of geographical with historical instruction led to the injury and neglect of all school teaching; that even if geography is viewed as the only subject which connects physical science and mathematics with history, it should be joined with physical science in the instruction of the upper classes of schools; and lastly, that geography in the Government examinations of teachers should be admitted as a separate science, and also as an accessory subject assisting to an important degree various other branches of learning." Afterwards followed an interesting discussion on the subject of the employment of graphic illustrations in geographical teaching, started by Professor Wagner of Göttingen. He said that in learning the position of countries and places, maps and geographical drawings were the chief aids, and on this account instruction in geography ought to be entrusted to physical and mathematical teachers, whose sense of form and skill in drawing were far better developed than they are in teachers of philological and historical subjects. He did not advocate the drawing of complete maps as part of the lessons, such being too complicated, but the free-hand sketching of simple cartographic elements—limited areas of country, &c.—gradually increasing to more complicated subjects.—The next meeting, that of 1882, of the collective German geographers was appointed to be held at Halle.

——— June 9th, 1881: Dr. Nachtigal, President, in the Chair.—At the commencement of the meeting the President made allusion to the Congress of German Geographers, just terminated, and also to the International Congress of Geography which is to meet at Venice in September. He then announced that Dr. Buchner, their traveller in West Central Africa, on his way home from the Muata Yanvo's country, was making a stay of considerable duration at Malange, where he was writing up his diaries; and that a letter had been received from Dr. Stecker, dated March 18th, from the shores of Lake Tsana in Abyssinia, where the traveller was preparing to commence his explorations under the protection of the Negus. Mr. Gerhard Rohlfs then gave a sketch of his journey to Abyssinia and the residence of the Negus at Debra Tabor, in which he drew an attractive picture of land and people in those regions.—A paper was read "On Geography and Anthropology" by G. Fritsch, in which the author dwelt on the close connection between these two departments of science, and insisted upon the necessity of a more intimate alliance than at present exists between them.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

ASIA.

Hunter, W. W.—The Imperial Gazetteer of India. London (Trübner and Co.): 1881, vols. i.–vi., 8vo., map. Price 2*l*. 2*s*.

The three other volumes intended to complete this long-desired work will be issued during the present month. The portion now published comprises:—Vol. I., pp. i.–xxxiii., 1–544, Abar–Benares; Vol. II., pp. 1–539, Bengal–Cutwá; Vol. III., pp. 1–567, Dábha–Harduaganj; Vol. IV., pp. i.–xix., 1–716, Hardwár–Jalálpur-Nahvi, with statistical appendices to the included article "India," which itself occupies pp. 129–644, and is also synoptically discussed in the preface; Vol. V., pp. 1–509, Jalandhar–Kywon-pya-that; Vol. VI., pp. 1–531, Labanakhya–Mysore. A map (scale 265 miles to the inch), expressly prepared for the work, is reproduced in each volume.

As regards mere bulk, the portion now published is already a trifle in excess of the four thick volumes of Thornton's Gazetteer, besides containing more matter, page for page. Indispensable as the latter work has been for some thirty years (though not written on any systematic plan), our Indian Empire has of late increased so vastly in interest that a new gazetteer has become an urgent necessity, both in this country and for the use of local administrators. This need has been to some extent supplied by various publications, such as the Gazetteers or Statistical accounts of the North-West Provinces, Rajputana, Mysore and Coorg, Sind, various parts of the Madras Government, and Bengal: these, however, are not accessible to the public, and are naturally of considerably less value than a work like the present, which covers the whole empire. It has taken the compiler, with every advantage of his position as Director-General of Statistics to the Indian Government, and with the supporting authority of the Secretary of State for India, no less than twelve years' labour to complete his task, during which he claims to have made personal expeditions in search of information extending over 50,000 miles. Assistance is acknowledged, not only from high officials, but from such authorities as Burgess, Cunningham, Hughes, Thuillier, and Yule, and Dr. Hunter bears willing testimony to the kindly action of the Government on all occasions. Not the least of his troubles was that of transliterating Indian proper names; and he candidly states that it will be possible to discover instances in which the rendering of a name in the Gazetteer differs from that ultimately sanctioned, owing to the difficulty of reconciling the lists supplied by Provincial Governments. But a steady progress is claimed for the author's uniform system, both in Parliamentary blue-books and the English and native press.

Midden Sumatra.—Reizen en Onderzoekingen der Sumatra-Expeditie, uitgerust door het Aardrijkskundig Genootschap, 1877–1879, beschreven tot de Leden der Expeditie, onder Toezicht van Prof. P. J. Veth. Leiden (Brill): 1881, sm. 4to.

This continuation of the work, of which the commencement was noticed in our 'Proceedings' for 1880, p. 588, consists of:—

I. 2de Aflevering. Reisversbaal, Eerste Gedeelte, beschreven door A. L. Van Hasselt en Joh. F. Snelleman, Leden der Expeditie. Pp. 129–432, i.–viii., pls. i., iii., iv., vi., ix., xi., xii.

This completes the first part of the description of the journey. The plates, from photographs by Mr. D. D. Veth and Mr. J. A. Meessen, are of especial excellence.

II. 2de. Aflevering. Aardrijskundige Beschrijving, door D. D. Veth. Pp. 57–136.

Contains statistical details of population, and means of communication, the export of coal from Ombilin, and the amelioration of means of traffic on the west coast of Sumatra.

III. 2de. Aflevering. Volksbeschrijving en Taal, door A. L. Van Hasselt. Eerste Afdeeling, Volksbeschrijving, pp. 1–80, and description of plates, pp. 1–24, pls. xx.–xxii., xxvi.–lxiii. Tweede Afdeeling, Taal, pp. 81–180, i.–vi., facsimile. (Completing this second portion of the 3rd section under the title of "De Talen en Letterkunde van Midden-Sumatra.")

IV. 2de. Aflevering. Natuurlijke Historie, door Joh. F. Snelleman, met Medewerking van vele Buiten- en Binnenlandsche Geleerden.

Contains the plate of the Reptilia, completing Part 2; the whole 5th part, Neuroptera, by Herman Albarda, pp. 1–22, pls. i.–vi.; the whole 9th part, Diptera, by F. M. van der Wulp, pp. 1–60, pls. i.–iii.; Part 13, Section B, Botany, a list of the timber trees, bamboos, and rattans of Central Sumatra, by A. L. Van Hasselt, pp. 1–42.

Satow, Ernest Mason, and Hawes, Lieutenant A. G. S.—A Handbook for Travellers in Central and Northern Japan. Being a Guide to Tōkiō, Kiōto, Ōzaka, and other Cities; the most interesting parts of the Main Island between Kōbe and Awomori, with ascents of the principal Mountains, and descriptions of Temples, Historical Notes, and Legends. Yokohama (Kelly): 1881, cr. 8vo., pp. 489, maps, plans.

The authors have here produced a very perfect imitation (down to the most minute mechanical detail) of the well-known Murray's Handbooks. Part of the material has appeared in another form in the *Japan Mail* and *Japan Herald*, but the greater portion is new; the authorities from whom assistance or extract is acknowledged are such as to inspire confidence, and the well-known name of Mr. Satow, Secretary to H.B.M. Legation, would of itself be sufficient to recommend the volume to English visitors. The Introductory information, though short, contains useful notes on the general geography of the islands, climate, language, and other points essential for the traveller's comfort; and a short, classified list is given of recent useful books on Japan (supplemented by another list given by the publisher inside the cover of the volume). The chief cities referred to in the title are described at some length, with their respective environs, and the main connecting roads and branches.

Loose maps of Central and Northern Japan accompany the book; these have been traced from a map of the whole country recently published by the General Staff, and are on the scale of 7⅞ Ri (= nearly 19 English statute miles) to the inch. A sketch map of the environs of Miya-no-shita and Fuji has been taken from the new sectional maps of the Topographical Bureau, and special plans of Tōkiō, Kiōto, and Ōzaka have been compiled for this work.

Séréna, Carla.—Mon Voyage (Souvenirs personnels). II. Une Européenne en Perse. Paris (Dreyfous): [1881], 12mo, pp. 553, frontispiece. Price 3*s.*

Describes the incidents of the authoress's journey from Baku to Tehran. She crossed the Caspian to Mash-had-i-sar, and thence travelled by caravan to Barfrush, taking the usual route across the Elbruz range viâ Amol and Shahzade, round the base of Demavend to Ask, and reaching the capital by Rudehan. The greater part of the volume is occupied by conversational descriptions of the domestic and political economy of the Persians, the authoress's personal troubles, &c.

Walker, Major-General J. T.—Account of the Operations of the Great Trigonometrical Survey of India. Vol. VI. The Principal Triangulation of the South-East Quadrilateral, including the Great Arc, Section 18° to 24°, the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Bilaspur Meridional Series, and the details of their simultaneous Reduction. Dehra Dun (Office of the Survey): 1880, 4to., pp. i–xxiv., 1–164; i *a*–xiv *a*, 1 *a*–124 *a*; i *b*–xiii *b*, 1 *b*–226 *b*; i *c*–xxxix *c*, 1 *c*–161 *c*; i *d*–xiv *d*, 1 *d*–111 *d*; i *e*–vii *e*, 1 *e*–101 *e*; i *f*–xviii *f*, 1 *f*–128 *f*; skeleton chart, map, and plates.

The skeleton chart now given as a frontispiece enables a clear view to be taken of the triangulation as a whole, and the position of the section forming the subject of this volume relatively to the other divisions,—a decided improvement on former issues. The Malabar coast series, and a meridional series east of the Biláspur series intended to connect with the Hurilong meridional, alone appear from this chart to be unfinished. Some introductory remarks in the preface explain the broad features of the Survey. In referring to the details of the work, notice is especially drawn to the fact that all the longitudes require a constant correction, probably of – 2′ 30″.

AFRICA.

Trotter, Philip Durham.—Our Mission to the Court of Marocco in 1880 under Sir John Drummond Hay, K.C.B., Minister Plenipotentiary and Envoy Extraordinary to his Majesty the Sultan. Edinburgh (Douglas): 1881, 8vo., pp. xviii. and 310, map, photographs. Price 1*l.* 4*s.*

Captain Trotter accompanied the mission above referred to in April of last year, and here elaborates his diary during his residence in Marocco. The country traversed is already familiar from the writings of Leared, De Amicis, and others; and the map is enlarged from that published by the French War Department, supplemented by Tissot's, and by personal observations on the road, which was from Tangier by the inland route to Alcazar, Kariya el Habassi, and Fez; thence to Mequinez, northwards past Volubilis and westwards on the north of the Forest of Mamora (a passage through which was forbidden) towards the coast, which was reached near Rabât, the return north to Tangier being made viâ Mehdia, El Araish, and Azîla. The views of scenery and buildings, from photographs taken by the Hon. D. Lawless, who also accompanied the mission, are of especial value.

AMERICA.

Boyd, R. Nelson.—Chili: Sketches of Chili and the Chilians during the War, 1879–1880. London (Allen): 1881, cr. 8vo., pp. 235, map, plates (from photographs).

The author's chief attention was directed to the coal and other mineral resources of the country; but his notes, taken during a stay of some years, refer also to the general physical characteristics, and the political and domestic condition of the people, presenting a trustworthy view of the state of Chili at the present time.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Kiepert, H.—Politische Uebersichts-Karte vom Königreich Hellas oder Griechenland, mit Angabe der festgestellten Nordgrenze nach dem Vertrag von Constantinopel, Mai 1881. Von Heinrich Kiepert. (Separat-Ausgabe aus dem Hand-Atlas über alle Teile der Erde No. 25*a*.) Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Dietrich Reimer, Berlin, 1881. Price 1*s*. 6*d*. (*Dulau.*)

Maschek, R., sen.—Karte vom Salzkammergut enthaltend die Umgebung von Gmunden, Ischl, Hallstatt und Aussee, Salzburg, Hallien, Zell am See, Berchtesgaden und Reichenhall. Scale 1 : 150,000 or 2 geographical miles to an inch. Artaria & Co., Vienna, 1881. Price 4*s*. (*Dulau.*)

——— Umgebung von Trient, Rovereto und Riva am Garda See. Scale 1 : 129,000 or 1·7 geographical mile to an inch. Blatt XI. Touristen Karte v. Rud. Maschek sen. Eigenthum u. Verlag von Artaria et Comp. in Wien. Price 2*s*. (*Dulau.*)

ASIA.

De Rhins, J. L. Dutreuil de.—Carte de l'Indo-Chine Orientale, dressée par M. J. L. Dutreuil de Rhins. Publiée sous le Ministère de M. le Vice-Amiral Jaureguiberry. Au Dépôt des Cartes et Plans de la Marine en 1881. Paris. Equatorial scale 1 : 935,000 or 12·8 geographical miles to an inch.

This is a four-sheet map, which has been compiled from the works and observations of Hydrographic Engineers, Officers of the English, French, American, and German Navies, and from the explorations of missionaries. Two pamphlets have been issued in connection with this map, one entitled 'Avertissement Géographique et Orthographique sur la Carte de l'Indo-Chine Orientale,' and the other (which is an extract from the 'Bulletin de la Société de Géographie,' January 7, 1881) 'Routes Entre la Chine et l'Inde'; both of which contain much valuable information. The map (which is on Mercator's projection) is a good specimen of cartography, the routes and physical features are clearly delineated, the "Légende" being full and explicit, with a table of translations of geographical terms.

——— Carte de l'Indo-Chine Orientale, dressée par M. J. L. Dutreuil de Rhins. Publiée sous le Ministère de M. le Vice-Amiral Jaureguiberry. Au Dépôt des Cartes et Plans de la Marine en 1881. Paris. Equatorial scale 1 : 1,870,000 or 25·6 geographical miles to an inch.

This is a reduction of, and will serve as an index to the four-sheet map.

Indian Government Surveys.—River Hooghly. Fort Gloster to Pookooreah. Surveyed October and November 1880. Scale 1000 feet to an inch. River Survey Department, February 14th, 1881. Saml. Reed, River Surveyor. Photozincographed at the Surveyor-General's Office, Calcutta.

Petermann's 'Geographische Mittheilungen.'—W. S. & A. Blunt's Reisen in Nord-Arabien, Mit Benutzung der Forschungen von Saïd Pascha, Burton, Doughty u. A. gez. v. B. Hassenstein. Scale 1: 5,500,000 or 75·1 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 11. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Dubail.—Carte de la Tunisie. Scale 1 : 800,000 or 10·9 geographical miles to an inch. Dubail, Paris. Price 1*s.* 6*d.* (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Ost-Griqua- und Pondo-Land nach C. Henkel's Karte und anderen Quellen. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 10. Justus Perthes, Gotha. (*Dulau.*)

Trotter, Captain Philip D.—Map of the North-West portion of Marocco, showing the route followed by Mission under Sir John Drummond Hay, K.C.B., 1880. Scale 1 : 600,000 or 8·1 geographical miles to an inch. Constructed from a sketch map by Captain Philip D. Trotter, by Gibb & Hay, Edinburgh.

AMERICA.

Petermann's 'Geographische Mittheilungen.'—Reduction topographischer Aufnahmen im Süd-Westen der Verein^{n} Staaten unter Wheeler und Hayden, 1869 bis 1876. Scale 1 : 3,700,000 or 50·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 9. Justus Perthes, Gotha. (*Dulau.*)

Rand, McNally, & Co.—Large Township, County, and Railroad Map of New Mexico. Showing the confirmed and unconfirmed Spanish and Mexican Land Grants (with a history relating to same), Railroad Land Grants, Military and Indian Reservations, Latest Government Surveys, &c. Rand, McNally, & Co., Chicago, 1881. (*Trübner.*)

AUSTRALIA.

Pennefather, Captain.—Parker and Bayley Points, Gulf of Carpentaria. Scale 1 : 73,000 or one geographical mile to an inch. To accompany Captain Pennefather's Report upon "Explorations in the Gulf of Carpentaria and Surveys in the vicinity of Point Parker." Brisbane, 1880.

Petermann's 'Geographische Mittheilungen.'—Nordwest-Australien und Timor Meer, nach Alex. Forrest's Forschungen 1879 und den neuesten nautischen Vermessungen. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881, Tafel 6. Justus Perthes, Gotha. (*Dulau.*)

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in March and April, 1881:—

No.			Inches.	
477	m	=	0·78	South America, west coast:—Trinidad channel. Price 2*s.* 6*d.*
1601	m m	= =	3·0 6·0	China:—Wusung or Wongpu river. Price 2*s.* 6*d.*
1378	m	=	10·0	Sandwich islands:—Honolulu harbour. Price 1*s.*

No.		Inches.	
2305	m =	0·38	Norway, west coast:—Stav fiord to Romdals islands. (Plans, approaches to Aalesund, approaches to Freko.) Price 2*s.* 6*d.*
632	m =	0·1	Africa, west coast:—Walfisch bay to Orange river. (Plans, Port D'Ilheo, Spencer bay, Hottentot bay, Ichabo, Angra Pequeña, Elizabeth bay.) Price 2*s.* 6*d.*
1410	m =	0·63	England, west coast:—Bristol channel to New Quay. (Plans, Port Cardigan, Fishguard bay.) Price 2*s.* 6*d.*
1872	m =	0·7	North sea:—Calais to the River Schelde entrance. Price 2*s.* 6*d.*
553	m =	0·8	South America, east coast:—Cape dos Bahias to Tova island. Price 1*s.* 6*d.*
886	m =	7·0	Canary islands:—Ports Naos and Arrecife. Price 1*s.*
2414	m =	0·05	China sea:—Gulf of Siam. Price 2*s.* 6*d.*
358	m =	0·12	Japan:—The western coasts of Kiusiu and Nipon, including the Korea strait. Price 2*s.* 6*d.*
601	m =	0·25	Africa, west coast:—Isles do Los to Sherbro island. Price 2*s.* 6*d.*
733	m =	1·7	Red sea:—Hanfelah bay.

2454 Plan added, Port Bolinao.
61 Plan added, Fushiki anchorage.
2728 Plan added, Luanco harbour.
2168 Plans added, Cumshewa, Selwin, Skincuttle inlets.
394 Plan added, Coche island anchorage.
1285 Plan added, Salavery road.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1601	Wusung river	New plan, Wusung or Wongpu river	1601
1378	Oahu island, south coast	New plan, Honolulu harbour ..	1378
2305	Stav fiord to Romdals islands ..	New chart, Stav fiord to Romdals islands	2305
1596	Ichabo island	New chart, Walfisch bay to Orange River	632
632	Angra Pequena		
338 *a* to *e*	St. Lawrence river, from Ontario lake to Gallop rapids, 5 sheets.		
1410	British channel to New Quay ..	New chart, Bristol channel to New Quay	1410
1485	Fishguard bay, &c.		
1872	Dunkerque to Schelde river ..	New chart, Calais to the River Schelde entrance	1872
553	Port Melo	New plan, Cape dos Bahias to Tova island	553
1852	Plan of ports Arrecife and Naos on this chart	New plan, Ports Naos and Arrecife	886
358	The western coasts of Kiusiu and Nipon	New chart, the western coast of Kiusiu and Nipon	358
601	Isles do Los to Sherbro island ..	New chart, Isles do Los to Sherbro island	601
612	Isles do Los		
613	Tannaney and Mellacoree rivers		
615	Scarcies rivers		
633	Sherbro river		
733	Hanfelah bay	New plan, Hanfelah bay	733
739	Plan, Boria bay and Jyghur river on this sheet.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 2430. North America, west coast:—Queen Charlotte islands. No. 1869. Canary islands:—Gran Canaria. No. 1963. China:—Chelang point to Chauan bay. No. 2024. New Zealand:—Wangaruru harbour. No. 10*a*. Indian ocean:—South-east coast of Arabia. No. 2056. Indian ocean:—Sunda strait and its approaches. No. 1989. Nova Scotia:—Pictou harbour. No. 2363. Pacific ocean:—Tongatabu. No. 2389*a*. Australia, south coast:—St. Vincent and Spencer gulfs. No. 554. South America:—Magellan strait. No. 755. Pacific ocean:—Union group. No. 1922. North America, west coast:—Fraser river and Burrard inlet. No. 2189. North America, west coast:—Ports in British Columbia. No. 2842*b*. Baltic sea. No. 750. India, west coast:—Cundacudvoo to Anjengo. No. 2691. Pacific ocean:—Fiji islands. No. 120. North Sea:—Schelde river. No. 1967. Borneo:—Pantai and Bulungan rivers. No. 375. Labrador:—Sandwich bay to Nain. No. 1348. Borneo:—Natuna islands. No. 2135. Bay of Bengal:—Irawaddy river, sheet 1. No. 588. South America, west coast:—Tom bay anchorages. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—No. 3799. Côtes de France. Rade de Brest. 1880.—No. 3771. Plan de Tréport et de ses environs. 1880.—No. 3776. Côte d'Annam. Rivière de Hué. 1880.—No. 3772. Golfe de Pet Chely. Croquis de la Baie Shallow. Entre la Pointe Crique et la Pointe Rocheuse. 1880.—No. 3666. Carte de la Baie de Canada (Côte Nord-Est de Terre-Neuve). 1878.—No. 3782. Antilles. Martinique. Carénage de Fort de France. 1880.—No. 3780. Mer des Antilles. Vénézuéla. Croquis du Mouillage de Cumana (Golfe de Cariaco). 1880. —No. 3770. Côtes de Colombie. Croquis de l'Embouchure du Rio Magdalena (Bocca Ceniza). 1879.—No. 3763. Guyane Française. Croquis de l'Entrée de la Rivière de Kourou. 1880.—No. 3761. Guyane Française. Croquis de la Rivière de Kourou. 1880.—No. 3778. Détroit de Magellan. Croquis de la Baie Guirior. 1880.—No. 3785. Nouvelle Calédonie. Côte Est. Passages Intérieurs au Sud de Pouebo. 1880. —No. 3788. Nouvelle Calédonie. Côte Ouest. Baie de Uarai. Passes de Uarai et d'Isie. 1880.—No. 3590. Archipel des Marquises. Baie Périgot (Puamau). Côte Nord de l'Ile Hiva-Oa. 1877.—No. 3777. Océan Pacifique Sud. Nouvelles Hébrides. Ile du St. Esprit. Canal du Segond. Port Olry. 1880.

Indian Marine Survey.—Chart No. 1252. Bánkot and entrance to Mhar or Sávitri River. Published at the Marine Survey Department, under the superintendence of Commander A. D. Taylor, Superintendent of Marine Surveys. Calcutta. Price 2*s*.

Prussian Admiralty.—Seekarten der Kaiserl. deutschen Admiralität herausgegeben vom hydrographischen Amt. Nr. 69. Die Ost-See. Westliche Theil. Mit der Einsegelg. durch den Sund und die Belte. Scale 1 : 300,000 or 4·1 geographical miles to an inch. Berlin. 2 sheets. Price 4*s*. (*Dulau.*)

United States Hydrographic Office.—Charts No. 77. Low Archipelago or Paumotu Group, 1880, Price 1*s*.—No. 81. King George's Group, and Aratica or Carlshoff Island. Pacific Ocean. 1881, Price 9*d*.—No. 82. Ahii and Manhii, or Peacock and Wilson's Islands. Pacific Ocean. 1881, Price 9*d*.—No. 85. Dean's, Krusenstern's, and Lazareff Islands. Pacific Ocean, 1881, Price 9*d*.—No. 875. Harbors on the West Coast of Mexico. Angeles, Sacrificios, 1881, Price 2*s*. 1*d*. —No. 878. West Coast of Mexico. Isla Grande Harbor, 1881, Price 2*s*. 1*d*.—No. 884. St. Paul River. West Coast of Africa. 1881, Price 6*d*. Published at the Hydrographic Office, Washington D.C. J. C. P. de Krafft, Captain U.S.N., Hydrographer to the Bureau of Navigation.

ATLASES.

Andree, Dr. Richard.—Allgemeiner Handatlas in sechsundachtzig Karten mit erläuterndem Text. Herausgegeben von der Geographischen Anstalt von Velhagen und Klasing in Leipzig unter Leitung von Dr. Richard Andree. Parts 3, 4, 5, 6, 7, 8, 9, and 10. Price 2*s.* each. (*Dulau.*)

The following are the maps contained in Parts 3 to 10 of Dr. R. Andree's Atlas:—Part 3: 1. Nördlicher Sternhimmel. Südlicher Sternhimmel. 2 u. 3. Westliche und östliche Halbkugel. Nebenkarten: Wasserhalbkugel und Landhalbkugel. Die fünf Erdtheile in Mercator's Projektion. 4. Das Sonnensystem. Mondkarte mit vier Nebenkärtchen. 65. Niederlande. 66 u. 67. Grossbritannien u. Irland. Nebenkarten: Die Kanalinseln. Die Shetlandinseln. 68. Dänemark. Nebenkarten: Bornholm, Island, die Far-Öer. 69. Schweden und Norwegen. 70 u. 71. Europäisches Russland. 72. Völkerkarte von Russland. Nebenkarten: Der Kaukasus. St. Petersburg und Umgebung. Part 4: 13. Völkerkarte von Europe. Nebenkarten: Sprachgebiet der Basken. Sprachgebiet der Bretonen. Die flämische Sprachgrenze in Belgien. 14 u. 15. Europa, politisch. 16. Atlantischer Ocean. Meerestiefen und Telegraphenkabel. 25. Regenkarte von Deutschland. Mittlere Jahrestemperatur von Deutschland. 26 u. 27. Württemberg und Bayern. 28. Grossherzogthum Baden. 29. Elsass-Lothringen und Bayerische Pfalz. 30 u. 31. Rheinprovinz, Westfalen, Hessen-Nassau, Waldeck und Grossherzogthum Hessen. 32. Provinz Sachsen, Mecklenburg und Anhalt. Part 5: 21. Sprachenkarte von Deutschland. Religionskarte von Deutschland. 22 u. 23. Deutschland, politisch. 24. Höhenschichtenkarte von Deutschland. Bevölkerungs-dichtigkeit von Deutschland. 45. Völkerkarte von Oesterreich-Ungarn. 46 u. 47. Oesterreichisch-Ungarische Monarchie. 48. Wien, Prag, Buda-Pest nebst Umgegend. Religionskarte von Oesterreich-Ungarn. Part 6: 41. Böhmen und Mähren. 42 u. 43. Die Oesterreichischen Alpenländer. 44. Ungarn. 53. Italien, südliche Hälfte. 54 u. 55. Frankreich. 56. Französische Mittelmeerküste. Paris und die untere Seine. Part 7: 17. Grosser Ocean. Meerestiefen und Telegraphenkabel. Nebenkarten: Tahiti und Moorea. Tonga-Inseln. Markesas-Inseln. 18 u. 19. Deutschland, physikalisch. 20. Isothermen- und Windkarte der Erde. Religionskarte von Europa. 77. China und Japan. Nebenkarten: Peking und Umgebung. Tokio und Umgebung. 78 u. 79. Centralasien und Ostindien. 80. Hinterindien und der Malayische Archipel. Nebenkarte: Java. Part 8: 37. Provinz Pommern. 38 u. 39. Königreich Sachsen und Thüringische Staaten. 40. Provinzen Ost- und Westpreussen. 89. Die Nordost-Staaten der Union. 90 u. 91. Australien und Neuseeland. 92. Centralamerika und Westindien. Nebenkarte: Der Isthmus von Panama. Part 9: 61. Mittelmeerländer östliche Hälfte. Nebenkarte: Das Nildelta und der Sueskanal. 62 u. 63. Balkanhalbinsel. 64. Völkerkarte der Balkanhalbinsel. Konstantinopel und das Marmarameer. 81. Palästina. 82 u. 83. Nordamerika. 84. Südamerika nördliches Blatt. Part 10: Titelblatt und Inhaltsverzeichniss. 49. Sprachenkarte der Schweiz. Religionskarte der Schweiz. 50 u. 51. Die Schweiz. 52. Italien nördliche Hälfte. 85. Südamerika südliches Blatt. Nebenkarten: Südost-Brasilien mit den deutschen Kolonien und Uruguay. Chile. 86 u. 87. Vereinigte Staaten von Nordamerika. 88. Die Pacifischen Staaten der Union.

Part 10 completes this atlas, which was commenced in March 1880.

Bevan, G. Phillips, F.S.S., F.G.S., etc.—The Statistical Atlas of England, Scotland, and Ireland. Edited by G. Phillips Bevan, F.S.S., F.G.S., etc. To be completed in fifteen parts, each part containing three coloured maps and letterpress. Price 7*s.* 6*d.* each. Parts IV., Criminal, and V., Poor Law and Pauperism. W. & A. K. Johnston, Edinburgh and London, 1881.

Hurlbert, J. Beaufort, M.A., L.L.D.—Physical Atlas with coloured maps, showing the Geographical Distribution of Plants yielding food; Climates; Flora; Soils; Regions of Summer Rains; Geological Formations and Hydrography of the Dominion of Canada. By J. Beaufort Hurlbert, M.A., LL.D. Ottawa, 1880.

The avowed intention of the author of this Atlas is to correct the erroneous impressions held by many with regard to the climate and productions of the Dominion of Canada, and to do this he gives ten maps with explanatory letterpress founded on the early explorations of the Hudson Bay Company Officers, as well as the definite and full reports, and the Surveys of the Railway, Geological, and Surveyor-General's Departments. Mr. Johnson, chief draughtsman of the Department of the Interior, has given the author his assistance in the preparation and printing of the maps. This Atlas fills a great want which has hitherto been much felt.

Stieler, Adolf.—Hand-Atlas über alle Theile der Erde, neu bearbeitet von Dr. August Petermann, Dr. Hermann Berghaus und Carl Vogel. Parts: 22, 23, 24, 25, and Ergänzungsheft III. Price 2*s.* each. Justus Perthes, Gotha, 1880–81. (*Stanford.*)

The contents of these parts of the new edition of Stieler's Hand-Atlas are as follows:—Part 22: No. 65. China (Östlicher Theil). Korea und Japan. Von A. Petermann, 1 : 7,500,000. Nebenkarten: Der Canton-Strom und seine Umgebung, 1 : 1,500,000. Schanghai und Umgebung, 1 : 1,500,000. Tókio und Umgebung, 1 : 1,500,000. No. 88. Vereinigte Staaten von Nord-Amerika, Blatt 6. Von A. Petermann, 1 : 3,700,000. Nebenkarten: Der südliche Theile von Florida, 3,700,000. Der südliche Theil von Texas, 3,700,000. No. 91. Süd-Amerika, Blatt 2. Von A. Petermann, 1 : 7,500,000.

Part 23: No. 20. Deutsches Reich in 4 Blätt. Blatt 2. Von C. Vogel, 1 : 1,500,000. No. 33. Frankreich (Übersichtsblatt). Von C. Vogel, 1 : 3,700,000. Nebenkarte: Die neue Festung, Paris, 1 : 600,000. No. 75. West-Australien. Von A. Petermann, 1 : 1,500,000. Nebenkarten: Tasmania, 1 : 5,000,000. Neu-Seeland, 1 : 5,000,000. Der Isthmus von Auckland, 1 : 500,000.

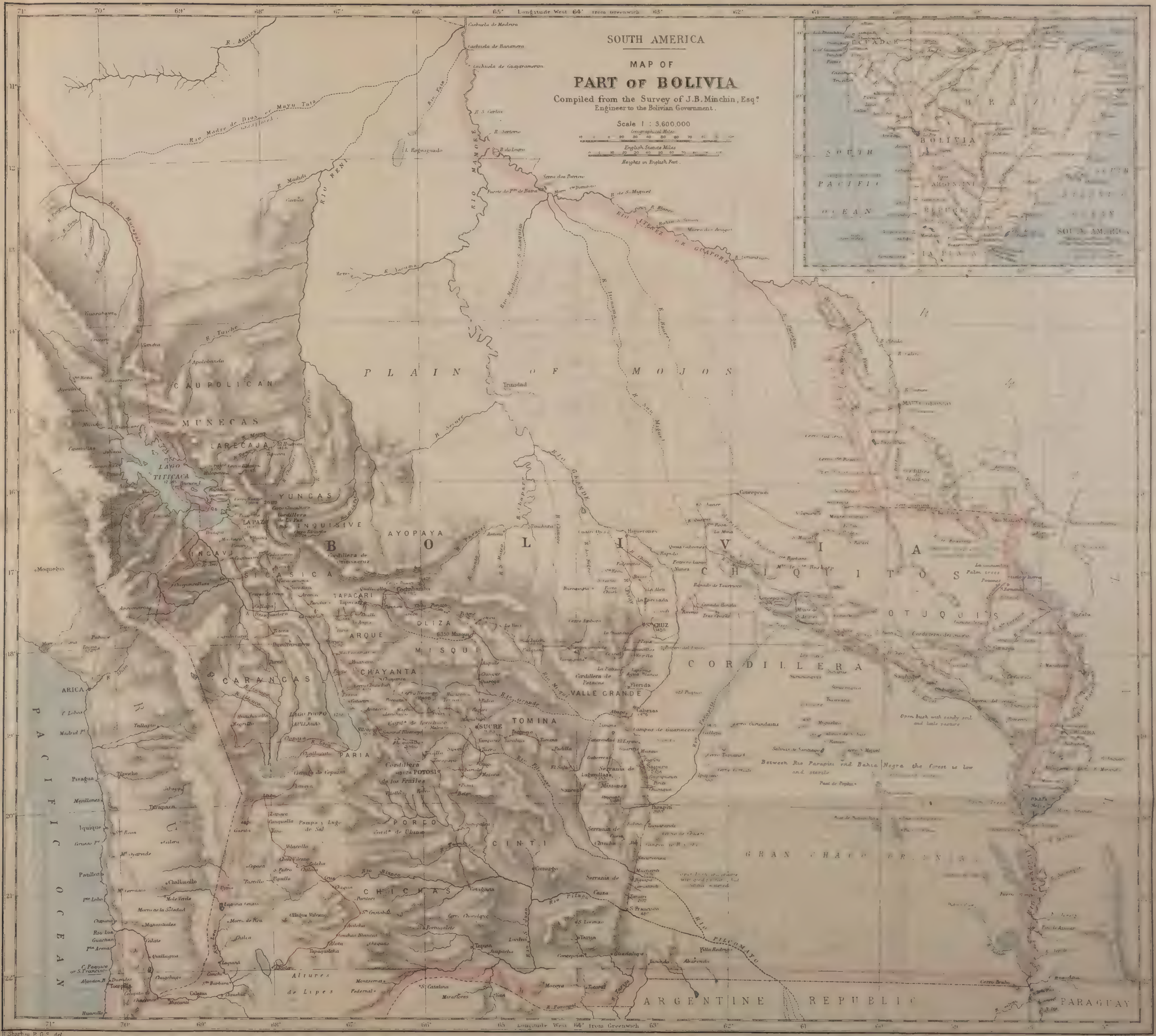
Part 24: No. 10. Nord-Polar-Karte. Von Hermann Berghaus, 1 : 20,000,000. Nebenkarten: Nord-Durchfahrt.—Ostküste von Grönland.—Beringstrasse.—Spitzbergen.—Franz-Josef's Land.—Nowaja-Semlja, 1 : 10,000,000. Nord-Cap—Neue Vulkane in Island, 1 : 2,000,000. Pendulum-Inseln.—Jan-Meyen, 1 : 1,000,000. Seeströmungen.—Nordlicht-Verbreitung. No. 16. Höhen-Karte von Mittel-Europa. Von Hermann Berghaus, 1 : 5,000,000. No. 87. Vereinigte Staaten von Amerika in 6 Blättern. Blatt 5. Von A. Petermann, 1 : 3,700,000.

Part 25: No. 56. Die Balkan-Halbinsel. Von A. Petermann, 1 : 2,500,000. Nebenkarten: Der Bosporus und Umgebung, 1 : 500,000. Constantinopel und Umgebung, 1 : 150,000. No. 72. Das Capland nebst den nördlich angrenzenden Gebieten. Von A. Petermann, 1 : 5,000,000. Nebenkarte: Die Capstadt und Umgebung, 1 : 150,000. No. 86. Vereinigte Staaten von Amerika in 6 Blättern. Blatt 4. Von A. Petermann, 1 : 3,700,000.

Ergänzungsheft III. Petermann: Karte des Mittel-Meeres. 8 colorirte Karten in Kupferstich. Maassstab, 1 : 3,500,000. Blatt 3, 4.

Swiss Federal Government.—Topographischer Atlas der Schweiz im Massstab der Original-Aufnahmen nach dem Bundesgesetze vom 18 Dezember 1868 vom eidgenössischen Stabsbüreau veröffentlicht. Scales 1 : 25,000 or 2·9 inches to a geographical mile, and 1 : 50,000 or 1·4 inch to a geographical mile. Bern. Parts 14, 16, 17, and 18. Price 13*s.* each. (*Dulau.*)

The following are the maps contained in these 4 parts of the "Topographischer Atlas der Schweiz":—Part XIV.: 8. Muttenz. 13. Schleitheim. 15. Neunkirch. 65. Winterthur. 67. Kiburg. 159. Schwamendingen. 210. Volketswil. 217. Lichtensteig. 218. Flawil. 220. Brunnadern. 231. Wattwil. 234. Kappel. Part XVI.: 56. Pfin. 57. Märstetten. 58. Frauenfeld. 59. Busnang. 70. Tobel. 72. Wil. 73. Neukirch. 126. Solothurn. 233. Uznach. 236. Ebnat. 282. Côte aux Fées. 284. Mauborget. Part XVII.: 16. Schaffhausen. 29. Maisprach. 31. Gelterkinden. 74. Bischofzell. 77. Arbon. 139. Gross-Affoltern. 141. Schüpfen. 142. Fraubrunnen. 154. Lenzburg. 156. Villmergen. 160. Birmensdorf. 161. Zürich. Part XVIII.: Linth-Canal. 366. Boltigen. 477. Diablerets. 481. St.-Léonard. 485. Saxon. 486 Sion. 495. Basodino. 527. Lourtier. 528. Evolena. 530. Gd. Combin. 530$^{\text{bis}}$ Mont Velan. 531. Matterhorn.



SOUTH AMERICA

MAP OF
PART OF BOLIVIA
Compiled from the Survey of J. B. Minchin, Esq.^r
Engineer to the Bolivian Government.

Scale 1 : 3,600,000

H. Sharbau F.R.G.S. del.

Pub^d for the Proceedings of the Royal Geographical Society 1881

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

A Journey among the Great Andes of the Equator.

By Edward Whymper.

(Read at the Evening Meeting, May 9th, 1881.)

Diagram of Route, p. 512.

I left England towards the end of 1879 to travel in the Republic of the Equator, for the purpose of exploring the Great Andes of that region, and with the object of investigating certain matters bearing on mountain-travel. One of the principal objects of the journey was to examine into the practicability of living at great elevations; but I have already, in another place, referred to that matter, and I do not propose to touch upon it here at all, beyond making one observation to correct misapprehension. By living for a considerable time at elevations of from 16,000 to 18,000 feet, and more especially by passing twenty-six consecutive hours at a height exceeding 19,000 feet, without sustaining inconvenience from the low atmospheric pressure which was then experienced, I concluded and believe that if it had been necessary for any purpose to mount several thousand feet higher, say to the height of 24,000 or 25,000 feet, we could have done so. But our experiences do *not* prove that any one could remain for a length of time at such an elevation as 24,000 feet, and unless this can be accomplished there is not the least probability, there is not indeed the possibility, that any one will ever reach, on foot, the summits of the highest known mountains. This is not merely a question of overcoming physical difficulties, it is a question of pressure; and it remains to be seen whether the human system can adapt itself to a pressure only *one-third* of that which we experience at the level of the sea.

Another of the principal objects of my journey was to compare the working of aneroid against mercurial barometers at great elevations, and also to find out how altitudes obtained by calculations based on the boiling-point of water compared with the indications of mercurial barometers. As these matters will be discussed at length elsewhere, I propose to make only a few general observations upon them now, and to speak first in regard to aneroids.

Though it is well known that a single aneroid is worthless for giving absolute determinations of altitude, many persons employ these instruments under the contrary supposition. It cannot be too widely understood that aneroid barometers, besides almost always gradually acquiring considerable errors, are liable through a variety of causes to *sudden* increases in their errors. When a traveller is possessed of a number of aneroids it is possible for him to detect these sudden increases by comparing one against another; but this is not possible in the case of a person who has only a single instrument, and in consequence he may be, most likely will be, led into the perpetration of serious mistakes.

It occurred to me that, if a number of aneroids were carried, it might be possible to obtain decent approximations to the truth by taking means of the whole of those which remained tolerably constant together, and rejecting those which were widely apart; and to settle this point I took out eight aneroids of the best construction, which had been under trial nearly twelve months before my departure, and which were the pick of a number of others which had been expressly made for the journey. I will tell you now how those eight aneroids behaved. Upon leaving England they were well together, the greatest difference between them being about the eighth of an inch, or, more exactly, ·13. The value of this difference at the level of the sea amounts to about 100 feet; and if the mean of the whole had been taken, there would have been but an infinitesimal difference between it and the reading of a standard mercurial. But by the time I arrived at Guayaquil this difference had increased to ·35; on arrival at Guaranda (8900) it had still further risen to ·74; at our first camp on Chimborazo (14,300) it had mounted to ·88, and at our third camp (17,200) to 1·2 inch. These were the differences of those which held closest together, rejecting those which had clearly gone mad. They differed amongst each other at starting to the extent of 100 feet, and by the time we had risen to 17,000 feet this difference had increased to about *two thousand* feet. If you consider that these were not aneroids selected at random, but were the pick of a number which had been expressly constructed for the journey, I think you will feel that this experiment conclusively demonstrated the uselessness of expecting to obtain absolute determinations of altitude from any number of aneroids; and expensive as the experience was I do not consider it dearly gained, as it decided that matter, so far as I desire to pursue it, for once and all.

The best of all ways to settle whether altitudes can be deduced with accuracy from the indications afforded by the boiling-point of water would of course be to conduct a series of experiments on the boiling-point at positions the height of which had been determined with scrupulous accuracy trigonometrically; but the opportunities of doing this at great elevations are not numerous, and such experiments can be performed at heights exceeding 16,000 feet in India alone.

The next best way is to compare them against the mercurial barometer, and as we had mercurials almost always with us, I took the opportunity to make experiments, with the result of finding that the boiling-point observations consistently yielded lower altitudes than the mercurial barometer, and I quote in illustration three of the highest stations at which water was boiled, namely, the summits of Cotopaxi, Antisana, and Cayambe.

The elevation of Cotopaxi by merc. bar. was	19,650
" " " boiling water	19,090
" Antisana by merc. bar.	19,335
" " " boiling water	18,714
" Cayambe by merc. bar.	19,200
" " " boiling water	18,600

For the sake of these experiments it was highly desirable that simultaneous observations should be made at the level of the sea at no very distant point, and I was fortunate enough to obtain the necessary co-operation. Upon being properly introduced at the Foreign Office, Lord Salisbury directed Her Majesty's officials in Ecuador to "afford me every aid and assistance," and these official instructions were sympathetically interpreted by Mr. Chambers, our consul at Guayaquil, who, at considerable personal inconvenience, read at 11 A.M. and 6 P.M., from December 1879 to July 1880, a standard mercurial which I left with him; and, by so doing, not only rendered me a great service, but enabled to be placed on record the range of the barometer at Guayaquil, which was in itself a matter of interest. Having now cleared away these extraneous matters, I next propose to indicate to you the routes which we traversed.

Leaving England on November 3rd, 1879, I arrived at Colon just as transit over the Isthmus was stopped for ten days in consequence of extraordinarily heavy rain. It would have done the heart of M. Lesseps good could he have arrived at the same time, to see that, whatever difficulties he might have to overcome on the Isthmus, he would at least be free from the want of fresh water—which was a serious consideration to him when directing the construction of the Suez Canal; but, as I had less interest in that matter, the detention would have proved wearisome to me had I not had the great pleasure to be in the company of one of the most amiable and accomplished of your Associates, who I hope will one day plant the British flag on the North Pole, towards which he has had the honour of carrying it farther than any other person—I mean Captain Albert Markham. I parted from him at Guayaquil, and then proceeded with as little delay as possible along with my two Italian mountaineers—the cousins Carrel—to Guaranda, and worked in the neighbourhood of Chimborazo for four weeks. The younger of the Carrels being badly frost-bitten on that mountain, our operations were stopped in this district, and we went on to Machachi, as in that part I could work with a single man; and with him I ascended the mountain Corazon, lying to the west of the town, and subsequently made an abortive attempt to ascend Illiniza from the south. When the younger man was sufficiently restored we ascended Cotopaxi, remaining on the summit twenty-six consecutive hours, and before returning to Machachi also ascended Sincholagua, which is the principal of the less important peaks of that district. We then transferred ourselves to Quito, and speedily set out for Antisana, where on our first attempt we were discomfited and had to try again. When we had stood on *that* summit we returned to Quito, and next made a little excursion to Pichincha and ascended two of its peaks. Returning again to Quito, we (after the lapse of a few days) set out for a journey to the north, and upon this explored the great Equatorial mountain Cayambe, the scarcely heard-of peak called Sara-urcu (which gave us more trouble than any other), and the fine mountain Cotocachi, which is the dominating summit of *its* district. I then proceeded still farther to the north, to the towns of Ibarra and Carranqui, sending my two Italians back to Machachi, with strict injunctions not to show their faces again until they could show me the summit of Illiniza at the same time. Soon after I returned to Quito, broken-down and fit only for bed, they were able to present me with the highest rocks of Illiniza, having successfully accomplished their mission.

I remained at Quito for a month, in a very feeble condition, and then set out southwards; made a journey from Riobamba to Altar, but was unable even to see its summit whilst in its neighbourhood; and then, as time began to press, we made our way to Carihuairazo, which we ascended on June 29th, and continued round the western side of Chimborazo, making a second ascent of it on July 3rd, and then returned to Riobamba, and subsequently to Guayaquil through Guamote and the Bridge of Chimbo.

It is impossible, in the brief space which I have at my disposal this evening, to give you the faintest idea of the numerous points of interest which were presented on this journey; and I conceive that I shall be more likely to secure your attention if, instead of attempting to hurry over the whole, I group together a few remarks on some of the more prominent features of the country, and then, in conclusion, refer in some little detail to one of the journeys.

The Republic of the Equator is a country which has seldom been brought before this Society, and the information that there is in existence about it is derived from comparatively few authorities. It is bounded on the west by the Pacific, and is supposed to be bounded on the north by Colombia, on the south by Peru, and on the east by Brazil. On the north and south they have some faint idea where the country terminates, but if you ask the great proprietors on the eastern side how far their properties extend, they will reply, "We shall be much obliged if you will tell us;" or, "As far as you can go to the east;" or, "We have no boundaries."

The only map of any size of Ecuador that can be procured is that by Villavicencio. It is highly imaginative, and delineates rivers flowing in the most delightfully symmetrical curves, and wonderful mountain ranges, such as the human eye has never looked upon. It is very generally ridiculed in the country, and it is well known that it is scarcely more than a bad copy of the earlier map by Maldonado, with alterations which in many cases are not improvements. In the remarks which I shall make to you I shall not follow its guidance, or the guidance of any previous traveller, and shall speak from personal observation alone.

From a geographical point of view, the country may be regarded as divided into three territories, namely, (1) all the land on the Pacific side of the Andes, (2) the high mountainous land of the interior, and (3) the less high land on the east of the second section, containing the head-waters of some of the tributaries of the Amazons.

The land on the Pacific side in the neighbourhood of Guayaquil, and some distance north and south, is extremely flat, and is of the nature of a delta, with numerous rivers and natural canals interlacing one another in such a way as to render it difficult to follow out any one in particular. The land here is so little elevated that in the rainy season a great part of it is submerged, and at that time you travel by canoe as far as Savaneta, and indeed somewhat beyond, over what during the rest of the year is the road to Quito.

When you quit this flat, outlying land, you find the slopes of the Andes rise without intermission, very steeply; and the abrupt manner in which the mountains commence to ascend from the flat land of the western region is not less noticeable than the extraordinary steepness of the slopes facing the Pacific. There is no route in the Alps which is regularly traversed in which you rise to so great a height in so short a lateral distance as you do in going from the village of Muñapamba (which is 1300 feet) to the top of the pass in the outer range, which is 10,400 feet above the sea-level. Dense and unpenetrated if not impenetrable vegetation covers the Pacific slopes up to the very crest of the ridge; giant trees rising straight upward mast-like for hundreds of feet, festooned with parasitic creepers, and enveloped at the base with a mass of tangled undergrowth, shut out the light, veil the path in obscurity, and limit the view to a few yards on either side. In the wonderful varieties of the objects which are noticed at every turn, the naturalist finds compensation for the deprivation of light and air; but the prolonged limitation of the prospect, the stagnation of the atmosphere, and the absence of the sun produce at length a craving for a less-confined horizon; and I could not feel surprise at the remark of my men, when at last they heard the music of the mountain streams playing amongst the boulders, "Ah! *now* we begin to breathe!"

I used just now the term "outer range," and I should explain that before arriving at the (at this part) main range of the Andes, which culminates in Chimborazo, you pass over another and less important range which forms the western boundaries of the basin of the river Chimbo. Though the highest points of this outer range attain to 15,000 feet, and it extends some 40 miles from north to south, you may look for it on your maps in vain. The river Chimbo takes its rise from the slopes of Carihuairazo and Chimborazo, and on the whole has a north and south course, until it makes a sharp bend round the southern end of the outer range, and then falls into the river Yaguachi, and ultimately into the river Guayas.

Still proceeding towards the east, you next see, on the opposite side of the Chimbo, the range which in this latitude is the principal range of the Andes. South of Chimborazo, and as far as I have seen it, it has an average elevation of 15,000 feet, and contains a number of small peaks, none much higher than the others. Passes across it are not numerous. The lowest of them is perhaps that by which we descended on to the point called the Bridge of Chimbo, on our return, and this is a little under 12,000 feet above the sea. Next to the north, the pass which is most frequently used is that by which the road to Quito goes over the great sandy plain called the *arenal grande*, which is somewhat more than 14,000 feet above the level of the sea. Then, continuing to the north, comes Chimborazo, the highest of all the Andes of the Equator, separated on its northern side by a depression called Abraspungo from the mountain Carihuairazo—a mountain with several peaks, the highest not much short of 17,000 feet, resembling the Blumlis Alp in Switzerland, but planned on a grander scale. North of Carihuairazo this range sinks abruptly towards the basin of Ambato, which town, 8600 feet above the sea, enjoys a mild and agreeable climate. No mountains of prominence are seen to the west of it, and for 30 miles to the north there is nothing of great importance. You then arrive at Illiniza, rising above 17,000 feet, and in the next 35 miles to the north, almost in a line with the last-named, come Corazon, Atacatzo, and Pichincha. These are isolated mountains, connected, it is true, though not forming an uninterrupted range. The depressions between these are never so low as 10,000 feet; but on the north of Pichincha there is again a break in the continuity of the range made by the river Guallabamba, which at the northernmost of the two bridges marked on the diagram is only about 5600 feet above the sea. On the other side of this river the slopes of Mojanda commence to rise, and this mountain, though not touching the snow-line, covers, I believe, more ground than any other mountain in Ecuador, its slopes extending on its eastern side as far as the village of Cayambe. North of

Mojanda you have the two considerable mountains Imbabura and Cotocachi, then there is the basin of Ibarra, scarcely more than 7000 feet above the sea, and still farther to the north the elevation of the country appears to increase.

Turning now to the south, we have first the great mountain Cayambe, covered with 5000 feet of snow and glacier, with the Equator just touching it. To its south-east there is a large glacier-bearing mountain called Sara-urcu, of which I shall speak more particularly presently; but then for a long distance to the south there is nothing very imposing until you arrive at Antisana, though the general elevation of the land is great—perhaps more than 13,000 feet. Antisana covers an immense extent of country, and has about the same amount of snow and glacier as Cayambe. To its south, so far as I could see, the mountains are small, and you have to return to the west for those of importance.

Pasochoa and Rumiñahui are comparatively diminutive, their apparent rank being more due to the steepness with which they rise than to their absolute elevation; but Sincholagua is a fine peak of thoroughly Alpine character, with a summit as sharp as almost any of the Chamounix aiguilles. Nearly due south of it is Cotopaxi, the second in height of all the Andes of the Equator, and then you have again a long stretch of country containing nothing striking until you come to Tunguragua, a snow-clad summit over 16,000 feet, of very regular shape. South of this lies the basin of Riobamba, bordered on its east by Altar, an extinct volcano, whose crater round three-fourths of a circle presents some of the grandest pinnacles that can be seen in the world, the highest of the whole being not unlike the appearance which would be presented if the famous Aiguille de Dru were perched on the top of the Eigher. Still farther to the south the country is again of moderate elevation, and the only great peak visible—the active volcano Sangai, which is not much inferior in height to Altar—lies away to the south-east.

This brings me to the end of this tedious enumeration—an enumeration which would not have been made had there not been an object in view. It is taught at school, and it is set forth in maps, that the Andes in these latitudes are divided into two chains—parallel to each other, and running approximately north and south—which are termed the Western and the Eastern Cordillera. The French Academicians who worked in this region towards the beginning of the last century are responsible for this statement, but its popular acceptance is perhaps more due to Alexander von Humboldt than to them. Before venturing to call in question a statement which has taken a deep hold on the public mind, and may almost be termed an article of the geographical creed, I have thought it prudent and advisable to present my facts; and the conclusion which is to be drawn from these facts will be apparent if you cast your eyes upon the route diagram given in illustration of this paper. You will see in a moment that there is not, and cannot be, such a thing as two lines of Cordilleras running parallel to each other. In the west, it is true, there are, as I have already pointed out, the four mountains Illiniza, Corazon, Atacatzo, and Pichincha, in a tolerably regular line. These must constitute part of the Western Cordillera. If you proceed north, you find yourself at once placed in the difficulty of not knowing whether to embrace Cotocachi, Imbabura, and Mojanda, or any one of them. Whether you do or do not embrace them, you will find it equally difficult to construct your second, or eastern, Cordillera. If you begin by placing Pasochoa and Rumiñahui in it, which two mountains *are* approximately parallel to the four on the other side, what will you do with the more important peaks of Sincholagua and Cotopaxi, and the still more important Antisana and Cayambe? To have extended the diagram farther southward would have made an illustration of inconvenient and unnecessary size. We had to draw the line somewhere, and we have drawn it at 1° S. latitude. Had the plan been extended farther to the south, the same thing would have been evident. I state unequivocally that there is no part of the whole country in which you will find two lines of Cordilleras even approximately parallel to each other, and possessing the importance which has, during this century, been attributed to them. I do not feel it incumbent on me to attempt to explain how this myth arose. The readiness with which it has been adopted by European geographers has no doubt been due to the absence of any map in which the positions of the great peaks have been correctly set down.

Passing now to the third territorial division—the country to the east of the Great Andes—we find there is still more to be learned. There is a route a little to the north of Antisana, through the village of Papallacta, not unfrequently traversed, which has been known for more than three centuries, and which, if not the exact route taken by the first discoverer of the Amazons, is something very like it; and there are one or two other routes more to the south, for which Riobamba or Baños are convenient starting-points, which have been less frequently followed; but the country between them is completely unknown to geographers, and it affords a nice field for young men of enterprise. I had some hopes that from the summits of the most eastern of the Great Andes we should have been able to gain some information about it. These hopes were not realised. On Altar, as you have heard, we could not even see the summit, and we ascended no higher than 14,000 feet. On Cotopaxi, during our prolonged stay, we saw nothing whatever towards the east; on the summit of Antisana we were completely enveloped in cloud; and on Cayambe, though we raced as hard as possible to endeavour to beat the clouds, and got on the top soon after 10 A.M., we were just too late, and again saw nothing whatever. The only point at which we learned anything was at our camp on Sara-urcu, where we stopped several days, and from it we saw ranges to our south and S.S.E. running out towards the east, exceeding 14,000 feet in height, which must have been situated to the north of the river Napo. We got here into gneiss and mica-slate, and this was the only place at which we found such rocks.

I return now to the Great Andes of the interior. The whole of the mountains that we visited are or have been volcanoes. They are mountains which have been formed upon mountains—cones which have burst through and been piled up, on a basis of sandstone. In the neighbourhood of Chimborazo, and again in the ravine or quebrada of Guallabamba, sections of sandstone several thousand feet in thickness can be seen, sometimes fine and sometimes coarse, and always very loose and crumbling. Some of these old volcanoes, judging by the immense accumulations of glacier which now cover them, must have been extinct for centuries at least, and their rocks bear a close family resemblance to each other.

There are now only two volcanoes in Ecuador possessing such a degree of life as entitles them to be considered active ones, though there are two others, namely Tunguragua and Pichincha, which are frequently classed as such, and are anyhow not entirely extinct. I saw the summit of Tunguragua quite clear of cloud several times whilst in the neighbourhood of Ambato, and upon no occasion perceived either smoke or steam issuing from it, and the case was the same with Pichincha. But Sangai and Cotopaxi are both fully entitled to be considered active volcanoes, and are seldom at rest. Sangai has been seen by few persons, either European or Ecuadorian, and I only saw it when we were encamped upon Chimborazo at a height of 17,300 feet, and then only in the early morning. We *heard* it frequently before this, first of all when we were established at Guaranda, not less than 40 miles away, and it detonations were remarkably sharp and distinct, and were sometime sufficiently loud to make us start. We scarcely ever heard them except in the morning, but I do not think it should be inferred that they occurred only at that part of the day, and that the travelling of the sound was impeded by the clouds which were invariably formed over the whole intervening country as the day advanced.

Seen from Chimborazo, Sangai presents the appearance of a regular cone, and it is a very fine mountain, though less stately and symmetrical than Cotopaxi. It has large snow-beds on the upper part of the peak, which die out before its apex is reached, and that is black, and is doubtless formed of slopes of fine volcanic ash. We saw scarcely any smoke issue from it, but at intervals of twenty to thirty minutes there were outrushes of steam, which shot up jet-like with immense rapidity to a height of 4000 or 5000 feet above the edge of the crater, and then spread out into a mushroom-like head, which was gradually drifted away by the wind. It is curious to state that, although there were no mountains intervening between us and Sangai, we scarcely ever heard any detonations from it whilst we were upon Chimborazo, though at Guaranda, as I have already said, nearly 9000 feet lower, they were sometimes loud enough to startle us. As we were obliged to leave Ecuador at a fixed date, we found ourselves unable to make a journey to Sangai, to examine it more closely.

SANGAI, AS SEEN FROM AN ELEVATION OF 17,400 FEET ON CHIMBORAZO.

We were a long time in the neighbourhood of Cotopaxi, and frequently saw it both close at hand and at considerable distances. More or less smoke mingled with steam was always issuing from its crater, and this rolled out in a leisurely way, unlike the violence of the eruptions which proceeded from Sangai; in fact, it was difficult to believe that it could be a very dangerous volcano. Yet, as I have related in another place, we ourselves once witnessed at a distance of 65 miles an eruption of ash, which was projected 20,000 feet in the air, and poured out in such volume that at the distance of 65 miles it produced the effect of twilight soon after midday. But Cotopaxi has done far worse than *that*, and what seems most feared are the floods which generally roll away from it during its greatest eruptions. Ecuadorians, and perhaps others, think that the water proceeds from the interior of the mountain, in short is erupted. I believe nothing of the kind, and that these floods are the result of the cone becoming unusually hot and liquefying the glaciers which repose on it. For there are glaciers, and considerable ones, upon it; though they are, from being blackened and obscured by ash, quite imperceptible at a distance.

All the lavas on the northern and western sides of Cotopaxi that we saw were evidently of considerable age, from the amount of mosses and lichens which were growing upon them. We found amongst them, moreover, at great altitudes, a variety of beetles, which is another indication that they are not very recent. Lower down, on the plain on the north-west of Cotopaxi, we found a beetle* which, it may be from the dearth of amusements in this neighbourhood, has the habit of standing upon its head. I found numbers occupied in this interesting pursuit; numbers more fallen over on their backs, kicking about, unable to regain their feet; and many lying dead upon their backs.

The mention of glaciers upon Cotopaxi naturally leads me to speak of the glaciers of Ecuador in general. As travellers of eminence have visited and published works upon this region, it is surprising to find that complete ignorance exists respecting its glaciers; yet that there is complete ignorance is evident from the statement made in the recently published article on Ecuador in the 'Encyclopædia Britannica,' in which it says that "the crater of Altar, surrounded by a steep and jagged wall of rocks, is remarkable as the bed of the only real glacier known to exist in the Ecuadorian Andes." I found, on Altar, larger glaciers *out*side the crater than that which was *in*side it; and I found others of large size upon Carihuairazo, Illiniza, Cotocachi, Sincholagua, Quilindaña, Cotopaxi, Cayambe, Sara-urcu, Antisana, and Chimborazo. The largest were upon the last-named four mountains; and I am able to offer a convincing proof of their existence by means of a photograph, an enlargement from a negative that I took at the height of 18,400 feet on Chimborazo, in which not only is a portion seen of the glacier which crowns that noble mountain, but it is possible to determine its thickness—a thing which it is seldom practicable with glaciers anywhere.

The manner in which I have to hurry forward entirely precludes me from entering into details respecting the glaciers, beyond saying that in general features they present no points of startling difference from the glaciers of Europe. Although on several of the mountains which have been named the glacier-covered area is comparable to the amount on Mont Blanc, the Equatorial glaciers never descend to so low an elevation as one would expect from glaciers flowing out of such extensive reservoirs. I know no instance of an Ecuadorian glacier descending so low as 12,000 feet, and they generally terminate between 14,000 and 15,000 feet. Moraines are scarce upon them, for the reason that few rocks rise above them, and the evidences which moraines frequently afford of former great extensions of glaciers is consequently wanting. *Roches moutonnées* are rare, more perhaps on account of the ease with which most of the rocks disintegrate than from any other cause. On the south side of Chimborazo, in a valley in which there is now no glacier at all, was the only place in which I was certain of *roches moutonnées*, but this single instance proved that glaciers on that mountain have formerly extended lower down than they do now.

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* A species of *Platycœlia*, belonging to the same tribe as our cockchafer.

It may be stated, as a general rule, that crevasses in the lower parts of the glaciers of the Ecuadorian Andes are both smaller and less numerous than in corresponding situations in the Alps, and this I take to be an indication that in the inferior parts of these glaciers the rate of motion is less rapid than in the Alps. But in the higher regions they are frequently of enormous size, and we never anywhere had seen greater—if indeed so large—crevasses as we encountered on the upper part of Antisana, where some were at least $\frac{1}{4}$ to $\frac{1}{3}$ mile long, 300 feet deep, and 50 to 60 feet across.

Upon the whole, I think that the glaciers are least extensive on the *western* sides of the mountains which have been enumerated, but I speak on this point with some hesitation, as I have not in several cases seen completely round them. It is only what might be expected in a country where vapour-laden easterly wind so largely preponderates. True east wind is, however, rare in comparison with north-east and south-east, which outweigh all the rest. Charged with vapour from the Amazonian cauldron, these winds are almost ceaselessly blowing against the opposing sides of the Great Andes, and depositing their moisture in the form of fine snow or hail. In the frequency with which it will be remarked that our ascents were made from the west, there is an illustration of our frequent inability to see anything through the clouds which enveloped the other sides. In *force* the winds were not remarkable. There were only two occasions—namely, on the summit of Cotopaxi, when the tent was occupying a very exposed position, and once at the second camp on Chimborazo (16,500 feet)—on which we were in danger from wind, and on these two occasions it blew in squalls with great ferocity, and we were afraid to venture outside the tent lest the wind should get inside and blow our habitation to tatters. It seems that we must regard as a fiction the celebrated wind which, "veering for a moment, gives the traveller a side blow and unhorses him," for on the whole we did not find wind in the Andes stronger than it is in Great Britain.

Though there seems to have been much exaggeration in respect to the force of the wind, there does not appear to have been any touching thunderstorms, and it is almost impossible to speak in too extravagant terms of the highly electrical condition of the Equatorial Andes. On no single occasion when we were at considerable elevations were we free from storms of greater or less severity. The whole air seemed saturated with electricity, and discharges might be determined at any moment. I think that the stray, occasional flashes which sometimes glared out between us and an intervening ridge, followed by a solitary roll, set us thinking more than the grand displays when the whole sky was *filled* with fiery darts, and crash after crash pealed out without intermission; though I never shall forget the occasion when on the top of Sincholagua, and close to the summit, on a narrow ridge of icy snow in which we were cutting footsteps, a ridge so steep and narrow that the merest touch might have tumbled us over on one or the other side, we were surprised by a storm, which commenced without premonition, and in a few seconds raged above, below, and around us, with a fury which made us quiver, and maintained a ceaseless roll, as flash after flash darted across our ridge, and others struck, or appeared to strike, the rock pinnacles beneath us. With our axe-heads hissing, and not knowing whether it was more dangerous to go down or up, we at length went forward, snatched a few rocks from the immediate top, and then fled, scarcely daring to look behind, and escaped in safety though astonished to find ourselves alive.

There is in consequence a blank in my column of heights in the accompanying table.* This sets forth the names of the mountains we ascended, the temperatures we enjoyed on their summits, and the elevations which are assigned to them—in one column by myself and in the next by the Doctors Reiss and Stübel. Now, first as to temperature. It is well known that in the towns in the interior of Ecuador there is a very small thermometric range, and this fact is often held up for admiration in geographical works. I do not myself profess entire admiration for it, for the incomparable—some persons say, the *abominable* laziness of the Ecuadorians has an intimate connection with the much-admired equality of climate, which renders it almost certain that to-morrow will be like to-day. They therefore put off doing everything until to-morrow, and when to-morrow arrives, until the next day, and so on. I think, however, that the thermometric range is larger than is generally stated. In a communication from Dr. Jameson, published just twenty years ago by this Society, it was stated that at Quito the thermometer never rises above 64° or sinks below 46°. He evidently refers to the Fahrenheit scale. In the bulletin which professes to be issued from the Observatory at Quito, I see it is stated that in the twelve months between December 1879 and November 1880, the lowest minimum was 3°·5 Cent., and the highest

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* Temperatures and Heights of Mountain Summits in Ecuador.

Ascent.	Name of Mountain.	Temperature on Summit.	Height in Feet.	
			Whymper.	Reiss and Stübel.
		Fahr.		
Jan. 4, 1880	Chimborazo	21°	20,517	20,703
Feb. 2, ,,	Corazon	37°–43°	15,871	15,801
,, 18, ,,	Cotopaxi	13°–21°	19,550	19,498
,, 23, ,,	Sincholagua	..	..	16,365
Mar. 10, ,,	Antisana	44°–60°	19,260	18,885
,, 23, ,,	Pichincha	46°	15,918	15,706
Apr. 4, ,,	Cayambe	32°–41°	19,200	19,161
,, 17, ,,	Sara-urcu	43°–55°	15,500	..
,, 24, ,,	Cotocachi	36°	16,289	16,293
June 29, ,,	Carihuairazo	38°–42°	16,480	16,752
July 3, ,,	Chimborazo	15°–20°	..	..

maximum 24° Cent. This would make the annual range exceed 20° Cent., which is a much larger amount than that stated by Dr. Jameson. These temperatures only refer to the city of Quito (9350 feet above sea-level), and what I desire to draw your attention to are the temperatures which were observed at much greater heights.

The lowest minimum observed during the whole of our journey was 19° Fahr. below freezing-point. This was the minimum of the night of February 18–19th, which was passed on the summit of Cotopaxi. The highest maximum observed during the whole journey was 75°·5 Fahr., at the bottom of great Guallabamba ravine, at 2.30 P.M. on March 27th. There was therefore only a difference of 62°·5 Fahr. between the greatest heat and the greatest cold experienced whilst we were in the interior. This is only about the range of the thermometer at London. But there were occasions on which considerable differences occurred in short periods. On one occasion on Chimborazo there was a range of 50° in three hours; and the most remarkable entry that I have in my journals in respect to temperature relates to Antisana, on the summit of which mountain we remained nearly two hours, in the shade and with a perfectly calm atmosphere the whole time, and yet the thermometer ranged from 44° to 60°, or eleven degrees higher than the greatest temperature that we experienced during three days at the hacienda of Antisana, which was 6000 feet lower down.

These extraordinary temperatures (which are quite improper, and contrary to our preconceived notions as to what ought to occur on the top of a snow mountain 19,000 feet high) interpose a difficulty in the calculation of the barometric observations, which has been felt by Mr. Ellis, of Greenwich Observatory, who has favoured me by entirely re-computing them; yet the results obtained by him and entered under my name in one column are perhaps more closely in accordance than might be expected with the results of Reiss and Stübel, which were obtained by an entirely different method. Our barometric determinations of the height of the towns in the interior closely agree, and for the height of Quito, at which place both of us amassed observations, we differ only to the extent of three feet, their results being 9350 and Mr. Ellis's 9353 feet.

The altitude in which you will take perhaps the greatest interest is that of Chimborazo, and in respect to that you see we differ to the extent of 186 feet. Villavicencio, twenty years earlier than Reiss and Stübel, stated the height to be 21,067 feet; Humboldt, forty years still earlier, made the height 21,424 feet; and the Spaniards associated with the French Academicians, in their book published at Madrid in 1748, made the height 21,611. Now it would seem from this that there is distinct evidence Chimborazo is sinking, for the farther we go back the loftier has it been.

There are, however, other persons who have measured the mountain, namely the French Academicians who were associated with the Spaniards, and on turning to their determination it is curious and interesting to find that it was 20,581 feet, or only 64 feet different from my own. It is perhaps rather cruel to inquire what value we are to attach to the results of observers who differed amongst each other more than 1000 feet over the height of a single mountain, the French making it 1030 feet less than the Spaniards, but it is pretty obvious that both cannot have been right; and as I find that the determinations of the French Academicians accord with Mr. Ellis's more closely than any other, I pin my faith to them.

This leads me to say a few words respecting the work of the French Academicians in the neighbourhood of Quito, which I venture to hope will be interesting to you. Most of you are aware that, in consequence of discussions which had arisen as to the figure of the earth, the French Academy of Sciences, at the beginning of the last century, determined to send out two expeditions to measure arcs at a great distance apart. One expedition went to the Gulf of Bothnia, and the other, composed of MM. Godin, Bouguer, and La Condamine, to the Equator. They commenced their work on a plain to the north-east of Quito, measured there a base line about 40,000 feet long, and from the two ends of the base took angles to various stations, and ultimately carried a chain of triangles to the north beyond Ibarra, and to the south to Cuenca, extending over more than three degrees of latitude. Towards the end of their work they measured a base of verification near Cuenca, also about 40,000 feet long, and found its length by direct measurement differed from the calculated length less than *two* feet.

The toise that the French Academicians took out as a unit of measure was a bar of iron, and it has ever since been known as "the toise of Peru." Guyot, in his standard work, 'Tables Meteorological and Physical,' in a discussion of the various measures of length most generally used, says that "it may almost be called *the only common standard*, to which all the others are referred for comparison"; "the legal mètre is a legalised part of the toise of Peru, and this last remains the primitive standard."

As the measurement of the first base line (on which all the rest of the work depended) was intended to be, and apparently was, conducted with the greatest possible care, it was natural that the Academicians desired that it should be preserved, and that the two ends should be marked by monuments of a permanent nature. This matter had, in fact, been discussed and settled before the observers left Paris, and on the spot La Condamine specially charged himself with directing the erection of two pyramids, one at each end of the base.

In a scarce pamphlet, evidently written though not signed by him, he recounts the difficulties that he experienced in this matter, —how he fixed the centres of the pyramids most accurately over the two ends of the measurement; how he had to make his own bricks, which he took care should be of a different size from those usually used, so that there might be no temptation to pull the monuments to pieces for the sake of their materials; how he had to construct a canal two leagues long to bring water for making mortar; and how stones had to be sought for and transported long distances on mule-back —this part of the business alone, he says, occupying several months, as a single stone often made a load. Then, in the case of the pyramid at the northern end, he found there was no solid foundation, and he had to create one by pile-driving, to search for wood fit for the piles, to bring workmen from Quito to fashion them, and to get them driven, and how the workmen ran away before the work was done. But *the* thing above all others which gave him most trouble was finding, dressing, and transporting suitable stones for the inscriptions. These stones were quarried in a ravine some hundreds of feet deep, and had to be hauled out by ropes, which had to be specially made, and then at the last moment the ropes broke, one of the stones was dashed to pieces, and they had to begin over again.

When at last all was complete, then there was infinite worry over the *inscriptions*, for the French Academicians had associated with them two Spanish naval gentlemen, who took exception to the phraseology, for the sake of their royal master, and for themselves, &c. &c. At last all was settled and finished, and La Condamine returned to Paris, arriving in 1745, after an absence of *ten* years, no doubt finding consolation in the thought that he had done a splendid piece of work, which could be referred to by generations to come by means of these monuments.

But towards the end of 1747, he heard casually that orders had been given by the Court of Spain to erase these pyramids, and this order was actually carried out before he had time to interpose. In the pamphlet to which I have referred he bemoans their fate, and recapitulates the details of their construction in a way which will almost raise a smile with those who do not know the country; but so little is this country changed, that the account reads like a narration of operations which have just been conducted, rather than a relation of things which happened a century and a half ago. He especially laments the supposed destruction of his two great stones for the inscriptions, but concludes in the spirit of a true man by declaring that all these things are of no importance in comparison with the loss of the measure of the base: "that length, which I had taken so much trouble to preserve, is now lost for ever."

La Condamine heard that orders were subsequently given for the reinstatement of these pyramids, though he probably never knew whether they were actually re-erected. When I was in Quito I felt a strong desire to learn what was their present state, and to find out if possible whether they occupied the same positions as before. For some time inquiries were fruitless, but at length Señor Rebolledo, the proprietor of the mountain Antisana, and one of the greatest landowners in the country, heard of them, and told me that there was in a farm at no great distance from one of his properties to the north-east of Quito, a stone which he believed was part of the original pyramid of Oyambourou, and invited me to go over to examine it. On the 15th of May last year, we rode over to his farm of Olalla, close to the town of Pifo, and on the next day went to inspect the stone. It was about four feet long and six inches thick, placed in the middle of one side of the courtyard, and was used as a mounting-block. There had been an inscription upon it, but it was completely worn out in the centre through the use to which it had been put. At its two ends some letters could still be made out, and going down on hands and knees to compare them with the description, which gives the original inscription line for line, I found that it was the very great stone which La Condamine had taken so much trouble to procure, and whose loss he had so pathetically lamented.

The pyramid which now approximately marks the southern end of the base is about 1000 feet distant from this farm, situated in a field of maize; and is neither the original pyramid nor the one which was erected subsequently, but is stated to have been put up some thirty years ago by a President of Ecuador, who so well understood the purpose for which it was originally designed that he moved it some hundreds of feet on one side, in order, he said, that *it might be better seen.* The traditional site of the earlier pyramids was pointed out to me, but I found no trace of them.

The pyramid at the northern end of the base was just visible as a speck of light, and we rode towards it, stopping, however, at a farm about half-way, where a French gentleman, Baron Gunzburg, had collected a party of friends. On the next day we all rode over to the northern end of the base, and found the pyramid which now stands there occupying just such a position as the original one is said to have done, at the very edge of the great ravine of Guallabamba, though whether it is anywhere near the original spot I am quite unable to say.

I have several times referred to the ravine, or *quebrada*, of Guallabamba, and it is one of the subjects upon which, in conjunction with the earthquake effects in general which are seen in Ecuador, I had intended to have spoken, and am obliged to omit in consequence of want of time. In Ecuador the term *quebrada* is employed for almost everything, from a ditch by the side of a road up to a valley of considerable size. In many countries the quebrada of Guallabamba would be reckoned a large valley, for it is, in round numbers, 3000 feet deep, and many miles long. In crossing it on March 27th, on our way to the north, we found that at the point where the descent commences it was 9306 and at the bottom 6470 feet above the sea. The surface of the country hereabouts is remarkably flat, and it was this which tempted the Academicians. In the centre of this plain you come to the quebrada, which is totally unsuspected until you arrive at its very edge, and then you find the surface parted, much as it might be if you could take up the crust of the earth in your hand and break it like a biscuit. The country to the north for a long distance is seamed and fissured in all directions by these earthquake ravines, and we traversed them on our way to Sara-urcu, the mountain about which I am about to speak.

This mountain, which has scarcely been heard of in England, was referred to by Villavicencio in his book as 17,400 feet high, though whether he had any foundation for that statement I have not been able to learn. Neither at Quito or elsewhere was I able to procure any information as to its whereabouts, beyond that it was situated somewhere about the Equator, and I started for it with no further information, though in possession of letters of introduction to Señor Espinosa, the proprietor of Cayambe, who, when he heard me mention the name, declared that the mountain (and all the country to the east) belonged to *him*, and that he would point out its direction.

When we started for the ascent of Cayambe, Señor Espinosa accordingly accompanied us to a height of about 14,000 feet, and pointed out a vague something in the clouds, which he said was Sara-urcu; but we did not see it until several days afterwards, and then it appeared only for a few seconds, just long enough for me to get an idea of its general direction. In those few seconds we saw, however, that we should in all probability be able to get up it, if we could arrive at its base.

This was the first thing to do, and before breaking-up camp on Cayambe, I sent two of my people in advance to prospect, to see if they could find another camping-place farther on. They reported that they had found *a regular palace, planted all round with shrubs*, and we accordingly transferred ourselves and all our animals to it on April 6th, finding on arrival that it was a solitary and deserted Indian hut in the midst of a primeval forest.

At this time I was ill with fever and other ailments, and went to bed in the hut during the 7th, 8th, and 9th, sending out on each day successive parties in search of a way. They all came back with most dismal reports. The animals, they said, could go no farther; there was an end to all paths or tracks, except occasional wild-beast tracks; there was nothing whatever to eat, and everything must be carried; there was no place to camp, the whole country was a dismal swamp; and everlasting rain was falling, so that although they supposed that they had been somewhere near Sara-urcu, they were quite unable to be sure. On discussion, we came to the conclusion that we must leave our tents behind, as we were not strong enough to carry both them, the wraps, and the food. Hence it was indispensable to find a place which would afford some little protection against weather and wild beasts, and on the third day they reported having found an overhanging rock which would answer sufficiently well.

On the fourth day—that is to say, the 10th of April—we made a forward move, leaving two men at the hut to tend our beasts, and keep up communications, half of our party going in advance, and the rest, including myself, waiting for the arrival of additional provisions from Cayambe village. These arrived late, and delayed us so much that we could not reach the next camping-place by nightfall, and had to camp in a swamp, on a spot where, if you stood still, you sunk up to your knees in slimy slush. This position was 13,000 feet above the sea, and during the greater part of the eleven hours' night sleet or rain was falling, rendering it well-nigh impossible to keep up a fire out of the sodden materials. For me, the men constructed a sort of floating bed, cutting down the reeds, and crossing and recrossing them, piling them up until they no longer sunk into the foul slime. For themselves they constructed smaller platforms of a similar description, and sat on their heels on them during the whole night, trying to keep up the fire.

On the fifth day we advanced and rejoined the others, having to pass through a country more difficult than anything we had hitherto encountered. The land was entirely marshy, even where the slopes were considerable; and upon it there was growing a species of reed or cane in such dense masses as to be well-nigh impervious. It was impossible to make any use of our machetas, for it would have taken several weeks' labour of our whole party to have cleared a track over a single mile. The only way of getting through it was by continually parting it with the hands, and as it was exceedingly stiff, and taller than the tallest man, it sprung back directly we let go, and shut us out from each other's sight. The edges of the leaves were very sharp and cut like razors, so that in a short time our hands were streaming with blood, for we were compelled every now and then to grasp them to save ourselves from sinking in the boggy soil. On this day we crossed the ridge dividing the eastern from the western rivers, and the streams we now met with flowed towards the Atlantic.

We joined the others in due course under an overhanging rock of mica-slate, which we afterwards found was known by the name of "Corredor Machai," or the hunter's refuge. It was almost the only spot in the whole district where it was possible to camp, and afforded good protection on one side, of which we were glad, as there were numerous tracks of bears, pumas, and other wild beasts round about.

At midday I sent away two men to advance provisions in the direction in which I supposed our mountain was situated, and they returned with a human skull which they had picked up not far away. "I know that skull," said one of the Indians who were with us, "it belonged to a man who went out here searching for quinine bark; there were twenty of them altogether, and four came back. This one laid down to sleep, and did not wake again." I sent back also some other of our men to bring up more provisions from the last camp.

On the sixth day I advanced with the Carrels and two natives to the spot where the food was placed the previous day, and left the rest at Corredor Machai to keep up communications with the former camp. On this day we had to descend to the bottom of a valley and remount on the other side, and whilst so engaged we saw a large black bear crossing our track, and going through the reedy ground right ahead as if it interposed no obstacle. We shouted to it, but it scarcely deigned to notice us, and only just turned its head aside for a moment and went straight on and vanished in a thicket of scrub. Tracks of wild animals were more numerous than ever here, and afforded us some assistance, as they had often trodden down the canes. We seldom on this day saw more than 200 yards in any direction, rain falling in a steady mizzle; and we encamped in the afternoon against a rock at the height of 13,700 feet, not knowing where we were, though believing that we were close upon Sara-urcu.

On the seventh day we remained at the same spot, making small excursions in various directions to try and find out where we were, discovering nothing, however, beyond a large glacier on our north, which we rightly judged proceeded from our mountain. The elder Carrel returned to camp in the course of the afternoon, saying, "Monsieur, just now I was over there, looking down at the glacier to try to find a way, when I heard a noise behind, and looking round saw two big bulls a few yards off, advancing with their heads down ready to pitch me over the precipice. I ran away up a rock, and they came after me, and one stood on one side and the other on the other, and when I tried to escape on one side they both came there, and when I tried the other side they both went there, but at last I escaped, and here I am, quite out of breath." "Monsieur," he said, "on my word of honour, they were as fat as butter, and skipped about like chamois!"

On the eighth day, as rain continued to fall without intermission, and we were sodden, without having the means of drying ourselves, we descended to Corredor Machai, leaving such things behind as we could venture to leave at the higher station.

Rain continued the whole day in a drizzle, which prevented us seeing any distance. The wind blew steadily from the east, though occasionally shifting to the north or south. We were evidently placed just at the meeting place of the winds blowing from the two sides, for in occasional openings which occurred towards Cayambe mountain we not unfrequently saw that that mountain was clear, through north-west wind blowing upon it, and keeping back the easterly drizzle in which we were enveloped. It was hard to keep up the spirits of my people. They all wished to return.

On the ninth day I remained at Corredor Machai all day, sending most of the people down to bring up food. It rained nearly all this day, and the next also until 5 P.M., when it cleared up a little, and showed us the position of Sara-urcu. I at once secured its direction precisely by theodolite, and made a sketch. This was the only occasion on which we had seen the mountain so far, and we did not see it again until the day we were quitting the district.

Having now got the bearing of the mountain exactly, its doom was sealed, and 5.30 A.M. (daybreak) on the eleventh day the Carrels with myself and two Indians started, and by a forced march reached the summit of Sara-urcu by half-past 1 in the afternoon, never seeing the top until we got on it, trusting to the guidance of the compass alone during the ascent. But we did not trust to it alone for the descent, and in order that we might return the exact way that we came, we cut a bundle of tops from the reeds, and planted them one by one in the snow on the glacier, so that let the hail fall, or let the wind destroy our track, we had the means of making a quick return; and it was exceedingly pretty when coming down to see the manner, as sailors would say, in which we picked these up. One had not died out of sight before another began to loom into view, and we came down without the least stoppage of any sort whatever; though, being surprised by darkness before we could arrive at Corredor Machai, we had to pass another wretched night at the higher station.

On this ascent we found that Sara-urcu was not, as it had been reputed to be, a volcano. Its highest rocks were gneiss, and we had evidently got beyond the strictly volcanic region. We found its height to be 15,500 feet, or 1900 feet lower than is stated by Villavicencio; but though the least elevated of the mountains we ascended, we found it bearing some of the greatest glaciers, which I believe, although situated exactly upon the equator, descend to a lower level than any in Ecuador.

Our work accomplished, we left Corredor Machai on the twelfth day, stopped for a day of rest at the hut, and on the fourteenth day that this little journey occupied arrived again at Cayambe village, heartily welcomed by the inhabitants, who did not expect to see us return from that dismal country.

Previous to the reading of the above,

The PRESIDENT said that Mr. Whymper needed no introduction to the Meeting, his name being well known to this Society as that of one of whom Englishmen were proud. Long before he went to South America he had distinguished himself for his enterprise and perseverance in climbing many hitherto untrodden peaks, and he had shown the greatest skill and courage in the midst of dangers, besides proving himself an accurate observer and careful investigator of nature in her various aspects. All these qualities he had manifested in a still higher degree during his adventures among the giant Andes.

After the paper,

General Sir H. L. THUILLIER said, though he had never been at greater altitudes himself than 10,000 feet, he had been connected with those who had trodden the icy glaciers of the Himalayas at even greater heights than Mr. Whymper had reached in South America. He understood that that gentleman had ascended to

20,517 feet. No doubt that was an extraordinary feat, because the effects produced on the physical frame by such high altitudes were well known, such as bleeding from the ears and nose; but some of those whose duty it was to perambulate the Himalayas had planted the theodolite at a height of 21,575 feet, while a considerable number had stood upon peaks varying from 15,000 to 18,000 feet. One distinguished officer of the Trigonometrical Survey of India, Major Thuillier, who was present at the meeting, had himself taken observations at 17,500 feet. He would like to have heard from Mr. Whymper what the altitude of the highest mountains which he saw was. In India the mountains rose to 29,000 feet. What was considered the highest peak in the world was known as Mount Everest, being named after Sir George Everest, a former Surveyor-General of India, but it was to be regretted that the local name had not been retained. It was almost on the meridian of Calcutta, in Nepal and north-west of Darjiling, and was called Gaurisánkar by the people in the neighbouring district. It was for many years traversed from east to west by the Great Triangulation, and the result of a great number of observations was to prove that its height was 29,002·75 feet. Lord Canning, who was at that time Governor-General of India, was extremely anxious to find a still higher peak, to be named after her most gracious Majesty; but though another had been discovered 28,278 feet, in Little Kashmir territory, and was still unchristened, but styled "K^2" for the present, none had yet been met with higher than Mount Everest. He complimented Mr. Whymper on his splendid achievements in mountain climbing, and said the Survey of India would be glad of such a recruit.

The PRESIDENT, in proposing a vote of thanks to the author of the paper, said that Mr. Whymper had stated that one of his objects in visiting the Andes was to discover at what height it was possible to exist. This reminded him (the President) of Coleridge's argument between the suicide and nature, where the suicide said,—

> "If the life be the question, and the thing sent to try,
> And to live on be 'Yes,' what would 'No' be? To die."

It was only among poets that any description could be found resembling Mr. Whymper's account of his adventures on the marshy heights of Sara-urcu. It was more like Milton's description of Satan's journey through chaos than anything else he had ever read. In his previous lecture before the Royal Institution, Mr. Whymper gave a less scientific, and less geographically useful, but an extremely entertaining account of his adventures, with minute descriptions of the terrible sufferings endured by himself and his two gallant mountaineers from the Alps. His predecessor on the summit of Cotopaxi had seen nothing, but Mr. Whymper remained there twenty-four hours, determined to look about him and make observations. Chimborazo had long been considered the highest peak of the Andes, but that now appeared to be a mistake, because Mr. Whymper had informed him that in Peru or Bolivia, south of the equator, there were points which were probably two or three thousand feet higher. One thing was clear, that Mr. Whymper had made important corrections, which would be of great value to cartographers in drawing maps of the district. They must all feel proud that it was an Englishman who had scaled the heights of all these mountains. With the single exception of Cotopaxi, none of the mountains had been previously ascended. Those who knew most of the Andes would best appreciate the value of the additions which Mr. Whymper had made to our knowledge of that range.

Mr. C. R. MARKHAM said his experience of the Andes only embraced the Cordilleras of Peru and Chili, and he was personally unacquainted with the Andes of Ecuador. He had listened with great interest to Mr. Whymper's theory respecting the non-existence of two parallel chains in Ecuador. In Peru, however, the two ranges were distinctly marked, one being generally of a volcanic character, and the other being fossiliferous to its highest summits. Mr. David Forbes had informed him that the loftiest mountains in Bolivia had Silurian fossils to their topmost heights. Mr. Whymper had stated that the peak of Sara-urcu (which meant *male maize*) was not volcanic. Possibly that might indicate a continuation of the Eastern Cordillera of Peru. Mr. Whymper appeared to have been informed that the President of Ecuador who ordered the restoration of the pyramids erected to mark the ends of the base measured by the French savans, placed them where they could best be seen instead of in the exact positions in which they were originally built. Don Vicente Rocafuerte, however, was well acquainted with the geodetic science of his time, and it was his intention and his orders, at all events, that the pyramids should be placed in their former positions. He was one of the most enlightened men who ever ruled in South America, a mathematician and good classical scholar, as well as a statesman. At present it is the fashion to depreciate South Americans, but it ought to be remembered that the South American Republics have produced men of great distinction as mathematicians, geographers, and botanists. At the present time, Don José Triana, of Colombia, is an eminent botanist, of European reputation, while our Honorary Associate Paz Soldan of Peru, Vidal Gormaz of Chili, and Moreno of Buenos Ayres are distinguished geographers.

Mr. ETHERIDGE said that Mr. David Forbes, whose observations had been alluded to by Mr. Markham, examined the geological structure of Peru and Bolivia in the years 1857–60, and brought home a remarkable series of fossils ranging from the Silurian to the Jurassic rocks. These fossils were examined by the late Mr. Salter and himself (Mr. Etheridge), the result of which was that twenty-five species were named. The Silurian fauna predominated and was observed by Forbes 25,000 feet above the sea at the summit of the Andes. These Silurian rocks occupied an area of 80,000 square miles. The Devonian formation was present also, many species from strata of that age having been collected. The carboniferous rocks ascend up to 15,000 feet in Bolivia, in the provinces of Arque and Oruro, and north of Lake Titicaca. These rocks are highly fossiliferous, containing many British species; besides these, Jurassic rocks extensively occur, with ammonites closely allied to our own species. The Jurassic series range from Chili through the Desert of Atacama.

Askja, the largest Volcano of Iceland; with a short Description of the Ódáđahraun. By WM. GEO. LOCK.

Map, p. 512.

HAVING twice visited Askja (in 1878 and 1880), of which there is no account in English except the brief notice by Mr. Watts,* the writer is enabled to give a fuller and more detailed account of this remarkable volcano.

Slightly to the east of the centre of the island lies the Ódáđahraun ("misdeed lava-desert"), the largest lava-desert in Iceland. According to the cartographer Herra Gunnlaugsson the Ódáđahraun has an area of 1200 square miles, and it forms part of a fire-blasted uninhabitable wilderness of at least double that area, lying between the Jökulsá and

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* In his paper in vol. xlvi. of the Royal Geographical Society's Journal, and in his book 'Across the Vatna Jökull.'

Skjálfandafljót rivers north of the Vatna Jökull, whose icy wastes stretch thence to the south coast. The area of the much smaller lava-desert around Hekla is stated by Professor Johnstrup to be twelve Danish (= 240 English) square miles.

Some ten miles south-east of the centre of the Ódáđahraun stands a large mountain, with numerous smaller ones lying to the north-east of it. These mountains are the Dýngjufjöll. They have been known by this name from time immemorial; and upon Gunnlaugsson's large map of Iceland a curious oval space is shown encircled with a mountain wall having an opening in the N.N.E.; the oval being named Askja ("basket"). This, presumably is the "bower" from which the mountains derive their name. As will be seen by Lieutenant Caroc's map, Askja is almost circular in shape, and has an area of not less than 23 square miles, its circumference being between 17 and 18 miles. Those who have Gunnlaugsson's large map will observe that the oval space shown thereon very incorrectly delineates Askja; and on the map accompanying Mr. Watts's paper the orological features of this part of the country are but a modification of Gunnlaugsson's, a long oval space being shown, with two breaks in its encircling wall on the east, and one in the south-west at the extreme end of the oval. It is believed that Gunnlaugsson never visited the Dýngjufjöll, for if he had I feel confident, from the correctness of his map in every other part of the island where I have been, that the orological features of the Ódáđahraun would have been more correctly delineated than they are. When in 1837 he made an excursion into this portion of the interior to map it out he was compelled by fogs and snowstorms to abandon his project, and it was with the utmost difficulty that his party made their way to a farm. It is asserted that he repeated his excursion in the following year, but for the reason just stated I doubt if he then visited the Dýngjufjöll.

Svartákot ("black-river-cot") is the nearest inhabited house to the Dýngjufjöll, from which it is distant in a bee-line 20 miles, and from here, in favourable weather, it is possible to ride across the Ódáđahraun to Askja in from ten to twelve hours, including the ascent of its engirdling mountains, to a height of 4500 feet, and the descent into the crater. The "cot" is situated about 16 miles south-west of Mývatn, and is distant two longish days' ride from Akureyri, the chief port in the north of Iceland. On both my excursions I hired the farmer at Svartákot as guide; he is not only a first-rate guide, but also a capital fellow in every respect.

The first hour's ride from the cot is across level moorland, alive with willow grouse (*Lagopus subalpina*), when the Súdrá (? "south-river") is struck. This river, which is tributary to the Skjálfandafljót ("shivering- or shimmering-flood"), flows through an extensive sandy waste—not lava-desert as shown on Gunnlaugsson's map, and there named Súdrárhraun—bordering the Ódáđahraun on the north-west. The course of the Súdrá is followed for about four miles, and the river is quitted at a spot where there is a very remarkable pool in which the water is in rotary motion, caused by a small hole at the bottom, through which it is descending to some underground channel. The source of the Súdrá is somewhat singular, consisting of numerous shallow pools in the sand, wherein frequently as many as half-a-dozen beautifully clear springs briskly bubble forth. The phenomenon is easily accounted for. The surface lava of the Ódáðahraun lying at a higher level than the sandy waste, the melted snows and rains percolating through the porous lava for centuries have worn channels in the substrata, along which the surface water now flows until it reaches the sand, through which it rises as we have seen. In about an hour after quitting the river the lava is entered. The Ódáðahraun lies at an altitude of about 1500 feet, and consists chiefly of countless lava-floods, varying greatly in age, some being thousands of years old and clothed with lichen, while others are as black and new-looking as those which flowed from the volcanoes east of Mývatn a century and a half ago. The newer lava-floods in the vicinity of the Dýngjufjöll on the north, have flowed from rifts which have opened time after time in Askja's encircling mountain wall, and at its base; while the south-west portion of the desert is stated by Mr. Watts to be covered with those which have flowed from the Trölladýngja ("Trolls-bower") which lies about 15 miles distant from Askja in that direction. Mr. Watts is the only man, I believe, save his guides, that has visited this mountain of late years, or crossed the desert between it and Askja; and it is to be regretted that he did not push on to the summit, so that he might have informed us whether a "bower" exists in the heart of this mountain similar to Askja. If such exists, it cannot, however, be nearly so large as Askja, the mountain being far smaller than the chief of the Dýngjufjöll. "The summit (of the Trolls-bower) was enveloped in clouds," Mr. Watts says, page 9 of his paper, "so I stopped within 300 feet of the top to get a good view of the country," and he subsequently makes no further mention of the mountain.

A large extent of the desert, especially in the north and north-west, is covered with lava that has welled forth from huge rifts in the substrata, in the same manner as a small lava-flood did north-east of Hekla in 1878, and a far larger one from Askja in 1875. The lava-floods which have issued in this manner are the newest looking and most rugged. The oldest superficial lava appears to be the last of veritable oceans of molten rock that at one time overspread the plain; its surface, congealed into innumerable dome-shaped bubbles, starred with deep fissures formed by the contraction of the mass when cooling, is passable on horseback, so evenly and freely has the lava flowed. As one's pony picks its way carefully over the flattened domes, the sound of its hoofs striking against the rock rings hollow, as if caverns were beneath, which is doubtless the case. Extensive tracts of black and lighter coloured pumiceous sand are met with, where depressions between the newer lava-beds have been filled in by pumice eruptions and sand-drifts in stormy weather.

From the above brief description of the "Misdeed lava-desert," it will be evident that it can only be traversed by a very circuitous route; a bed of the rougher lava will frequently compel a detour of over half a mile.

The ascent of the encircling mountain wall of Askja may be said to begin out in the desert, at a point eight miles distant from the highest part of the defile, through which on the north it is possible to descend into the crater. Here we meet with the first of a number of ancient lava-streams, that most probably issued from the volcanic vent beneath Askja before its present encircling mountain wall was built up; and as each succeeding lava-flow was less in bulk than the one preceding, they form a succession of not very clearly defined terraces, the surface of each having a slight upward gradient until just at the limit of the one above, where there is a steeper incline for 50 feet or so. The altitude above sea-level of the surface of the highest terrace is about 3500 feet, 200 feet less than that of the surface lava in Askja, and 1300 lower than the highest point of the pass.

Ascending these terraces in a south-south-easterly direction, on the left hand, for a distance of five miles, a number of crater-cones and hills of scoriæ, several hundred feet in height, evidently mark where the vast deposits forming the terraces have been disturbed and upheaved by explosions, caused by the molten matter beneath the lava-filled cauldron Askja struggling to force a vent; while for a like distance on the right hand there is a tremendous chasm, beyond which a mountain, seven miles in length from north-west to south-east, rises precipitously to a height of at least 4000 feet from the depths of the chasm. This mountain is not shown on any map of Iceland that I have seen, and I think must have escaped Lieutenant Caroc's notice, owing to the thick weather which he experienced on his journey to and from Askja. Peculiar black domes, possibly of obsidian, crop like Mount Paul in the Vatna through the snow covering the summit of this mountain.

Shortly after leaving the last terrace the ascent becomes more steep, and it is necessary to dismount from one's pony and drag it reluctantly after, carefully picking one's way over lava-flows that have forced themselves through rifts in the defile, the spots where these issued being marked by crater-cones built of a peculiar light-red, slag-like lava; and later on, over the ice lying in the defile, which forms a steep, slippery declivity between two mountain walls, whose jagged peaks rise on either hand to a height of close upon a thousand feet. The direction of this pass—named Jóns-skarđ ("John's Pass") in honour of the first man who visited Askja—is from N.N.W. to S.S.E., and it is about half a mile in width throughout its whole length, which, I should judge, slightly exceeds two miles. Upon both occasions when I have visited Askja the summers have been unusually hot, and the ice here has consequently been very rotten and dangerous. It is quite black in colour in places, owing to the immense quantities of black volcanic ash imbedded in it. The highest point of the pass is a few hundred yards from its southern end, where it terminates in a precipitous declivity of ice and ashes. From the verge of the precipice, a splendid view over Askja's weird amphitheatre is obtained. Lying 800 feet below is the lava-covered floor of this huge crater, whose circumference, as before stated, is between 17 and 18 miles, and its area at least 23 square miles. The somewhat jagged mountain wall encircling it rises above the floor of the crater to heights varying from 800 to 2500 feet. The highest hollows are filled with ice, and the peaks are snow-clad for ten months out of the twelve. In one place east of the pass there is a glacier exceeding four miles in length by one in width. Upon both occasions the floor of Askja, notwithstanding it lies 3700 feet above sea-level, has been free from snow at the time of my visit; owing, probably, to internal heat, as 20 miles south we have the glaciers of the Vatna Jökull, with a mean altitude of less than 5000 feet, and in the north-west of Iceland, at an altitude of less than 3000 feet, there are the icy wastes of the Glámu and Dránga Jöklar, neither of which tracts can possibly be more favourably formed for glacial deposit than Askja. The encircling mountain wall is highest on the south and north, and lowest in the north-east, where it does not rise more than 800 feet above the floor of Askja for over a mile. East of this there is a gap to the level of the lava-floods deposited in Askja, through which lava has coursed down the outer slope and spread over the Ódáđahraun. There is another gap in the mountain wall in the south-west, but the only man who has been through this gap is Mr. Watts, and he says that "a lava stream here enters from the Ódáđahraun, and has run for some distance uphill." From the appearance of the gap in the north-east, the declination, and especially the altitude of the surface lava in Askja, 2300 *feet above the level of the Ódáđahraun*, I am inclined to believe that Mr. Watts was deceived by some peculiarity in the appearance of a lava-flood from the south-west gap. It probably flowed from Askja in the winter season, and its outer surface, rapidly congealing, formed a covered way through which a molten stream coursed downward for some time; the supply ceased for a short period, a core of igneous rock formed in the covered way, and upon the flow recommencing, the lava stopped by the core was piled up above the upper end of the covered way, and now appears as though it had flowed upwards through it. Professor Johnstrup states that the lava on the eastern side of Askja has an inclination towards the gap in the north-east of 300 Danish feet in a stretch of 12,000, equal to one in forty, or a declination of 1° 26′.

The whole surface of Askja, save in the south-east where there is a hot-water lake five miles in circumference, and an extensive tract covered with pumice erupted in 1875, is a chaos of rugged lava-floods that have issued here at different periods. From those on the left, looking south across the crater from the pass over an area exceeding a square mile, ascend innumerable small jets of steam. These do not mark the site of the 1875 eruptions, however, for these stufa are dwarfed into utter insignificance by enormous volumes of steam that belch forth on the farther side of the amphitheatre close under its encircling mountain wall in the south-east. These bursts of steam issue from rifts and vents opened by the 1875 eruptions.

The crossing of the lava-covered floor of Askja from the foot of the pass, where one perforce leaves his pony, is most fatiguing work; each time that I have crossed it has taken me—a young and active man—four hours to proceed as many miles, most of the way by the aid of my hands, protected by thick woollen mittens that they might not be cut by the lava. I may mention that it utterly ruins the pair of boots worn while crossing; so that an old pair with good soles should be taken by any one who purposes in the future to visit this volcano. When within a mile of the northernmost of the large bursts of steam one is able to walk upright, the lava being buried under a covering of pumice, which rapidly increases in depth as the site of the 1875 eruptions is approached. The pumice is of three colours, light silvery grey, black, and golden-brown, the latter very fibrous, and presenting the appearance of masses of the interior of the outer husks of gigantic coco-nuts. This substance is fast degrading into pumiceous sand.

In crossing the crater four times I saw no lava anywhere so new-looking that it could possibly have issued as recently as 1875, but among the pumice were huge blocks of obsidian and pitchstone that had undoubtedly been ejected at the same time as that substance.

The apex of the slope formed by the pumice is a cone-shaped crater, whose summit lies about 250 feet above the superficial lava beneath the pumice. When I was here in 1878 tremendous blasts of steam were belching forth almost continuously with perfectly deafening roars, but this year (1880), to my astonishment, all was still; and upon climbing to the summit I found that in the crater at a depth of 150 feet was a placid pool of apparently cold water. About 10 feet above the surface of the water were several inconsiderable stufa. The diameter of the mouth of the crater is between 450 and 500 feet, and the interior tapers down to a diameter of about 300 feet at the level of the water. This crater is beyond all doubt "the shaft like the mouth of a large coal-pit" mentioned by Mr. Watts in 'Across the Vatna Jökull,' though it is not situated in the "N.N.E. corner," but in the south-eastern part of Askja; for there is no other volcanic vent here that will answer Mr. Watts's description. The crater is built up entirely of pumiceous sand and a clayey loam; I saw no traces in its walls of scoriæ, or lava-like slag.

By the reading of my aneroid in 1878 the summit of this crater has an altitude of 3850 feet, therefore the superficial lava in Askja at this spot lies at an altitude of 3600. According to Lieutenant Caroc's map, the lava just east of the north-east gap has an altitude of 3600 Danish feet = 3713 English, and the crater 3660 Danish = 3775 English.

This crater on the south-west slopes abruptly down to the surface of a hot-water lake lying some 600 feet below. The bed of the lake was formed by the disruption and subsidence bodily into an abyss beneath Askja of a huge mass of the lava deposits—of which more anon—oval in shape, of unknown thickness, and five miles in circumference. That this disruption and subsidence took place during the 1875 eruptions is proved by the fresh appearance of the face of the cliffs encircling the lake on the north, which show the strata underlying the present surface of Askja *en profile.*

Respecting the lava deposits thus bared, I beg leave to translate an interesting paragraph from Professor Johnstrup's paper read before the Danish Geographical Society.

"An excellent insight into the history of Askja's formation is here afforded, the vertical recently bared surfaces showing what a multitude of lava-floods must have been deposited in Askja's cauldron-shaped valley (*kjedelformige dal*) one above the other. The divisions between the lava-floods are distinctly marked by the layers of red slag-like lava which time after time has formed the surface of the underlying lava-strata; and I doubt very much if there can be found in any other part of Iceland—except the Almannagjá, where, however, the formation is far from being so distinct—such an instructive and grand profile as this. It has more than ordinary interest, owing to the striking resemblance presented by the volcanic deposits here to those widely spread rock-formations of basalt and dolerite which have been pronounced by most geologists to be of plutonic origin (*plutonisk Oprindelse*). Had they had an opportunity of viewing this profile, they would certainly have entertained a different opinion."

When the Professor visited the volcano, he says the surface of the sunken mass lay 740 Danish feet below its original level; and according to Caroc's map, a lake existed in the south-eastern part of this, nearly circular in form and 4400 Danish feet in diameter, the surface of its water lying at an altitude of 2885 Danish feet. In 1878 I found that during the two years which had elapsed since the Professor's visit, the lake had greatly increased in size, its water then covering the whole surface of the subsidence to a considerable depth, and from the level of the water this year (1880) I should say that it had risen quite 40 feet since 1878. This is not to be wondered at when it is borne in mind that the greater part of the rain and snow which fall in Askja doubtlessly drain into the abyss. The Professor adds that he found the temperature of the water 104° Fahr., but when I tested it in 1878 it was only 97° Fahr.

The presence of this vast quantity of water within the crater of an active volcano is a most alarming feature; a comparatively slight eruption might be attended by an explosion that would further disturb the lava-floor of Askja, which appears to be but a roof to an abyss in which molten matter, it is reasonable to believe, lies at no great depth; the contents of the lake would find its way below when a terribly violent explosion must inevitably ensue, one that will be likely to cause an earthquake to which that in 1875 will be comparatively insignificant; and likewise to affect the volcanic repose of Europe, by forcing back, by the violence of the concussion, the molten tide lying in the channel or channels, connected with the earth's interior, underlying Europe; there being reason to believe that such do exist and are connected with the Icelandic volcanic vents, the great European earthquakes and volcanic disturbances having been either followed or preceded by terrific eruptions in Iceland, e. g. the earthquakes that destroyed Lisbon in 1755 were preceded by the commencement of a series of terrible eruptions from the Kötlugjá, which lasted a year; while thirty-two years later the Upper Calabrian earthquakes were followed by the outburst of prodigious lava-floods in the vicinity of Skáptarjökull.

It is recorded that the great eruption of pumice took place on the morning of the 29th March, 1875, the eruption being preceded by a sharp shock of earthquake. A strong westerly gale must have prevailed at the time, for but a comparatively small quantity of the pumice ejected fell in Askja, the bulk being borne away to the eastward and scattered over the country in that direction and out to sea.

South-east of the lake, stretching into Askja's encircling mountain wall for nearly 1000 yards, is a deep gorge bordered on either hand with sheer precipices 600 feet in height at the very least. Herein are innumerable vents from which immense volumes of steam, perhaps also hot water, belch forth with such violence that the rock trembles under one's feet when standing 600 feet above them. This gorge has never been explored, neither by Johnstrup's party nor myself, for to make a descent therein a long rope is necessary, and with this I was unprovided; and owing to the clouds of steam which accompanied the more noisy outbursts it was impossible to see whether any hot water was ejected or not. However, I think it almost certain such is the case, and that one or more geysirs here exist, the stream of steaming hot water that was flowing down to the lake being too considerable to have been formed by condensed steam alone. By the violence with which the steam here escapes it is evident that even at this time (five years after the eruption) the heat in the abyss, whatever its nature, beneath Askja must be intense, and the pressure of steam very considerable, and that were it not for the vents, indeed safety-valves would be the fitter term, which here exist, another terrible eruption might at any moment take place.

The Askja eruption of 1875 is a very remarkable one in several respects. No lava was ejected from the volcano itself, this substance forcing its way through a subterranean channel for a distance of 30 miles ere it found a vent, coming to the surface in a desert region known as the Mývatns Öræfi ("Midgelake Desert") at a lower altitude by 2400 feet than the rift and crater in Askja, from which the pumice and ashes were ejected.

It was on the 4th January, 1875, that a violent explosion in Askja first notified to the Icelanders that a volcanic eruption of some magnitude was about to take place. This explosion caused an earthquake, one of the most alarming ever experienced, immense rifts 30 miles in length being opened in the deserts N.N.E. of the scene of the explosion. The greatest disturbance of the earth's surface at a distance from the volcano, took place at the spot where the lava-flood issued. Here an immense tract 20 miles in length, between two of the rifts, sank bodily into the earth to a depth of about 25 feet along its borders, and molten lava flowed forth nearly continuously for four months after the earthquake. The rifts on each side, where the tract has broken away, are somewhat similar in appearance to the well-known Allmens-rift and Raven-rift near Píngvellir, but narrower and far deeper, their depths not having been filled in with débris and soil, as is the case with the two mentioned. There can no longer be any doubt that the Allmens-rift and Raven-rift were formed by an earthquake and the breaking away and subsidence of the tract between them in the same manner as the two recently formed rifts here in the Öræfi.

The lava now forms a bed about twelve miles in length from S.S.W. to N.N.E., by from half a mile to three miles in breadth. It is very rugged; the supply having been intermittent, the earlier lava-flows congealed into beds of rock ten to twenty feet in thickness, which have been shattered into fragments and upheaved by later lava-flows, in whose fiery embrace the jagged masses of the torn-up beds were borne along partly imbedded, and from which, now that those later molten floods are solid rock, they project at all angles. Above the longitudinal fracture down the centre of the displacement, bed after bed of congealed lava had been upheaved, the fragments being everywhere piled up in the wildest confusion, and in places built up into cone-shaped craters having an altitude of from 80 to 150 feet. Owing to there having been no impediment to the free flow of the lava, in the trough-like hollow formed by the subsidence, it has an average thickness along its borders of about 12 feet. Allowing that the mean width of the lava-bed is one mile only, and that the surface of the sunken tract slopes upwards on both sides of the longitudinal fracture at an angle of but 5° (unquestionably it is considerably more, midway between the southern and northern extremities, there being also an upward slope in those directions from this point to the level of the Öræfi as well as laterally from east to west), the lava must be 236 feet in thickness along the centre, without taking into account the immense quantity piled up above the longitudinal fracture, gradually decreasing to 12 feet at the sides; and thus computed the whole mass of igneous rock which has here issued must amount in round numbers to 36,000 of millions of cubic feet!

Thus this lava-flood is considerably more than twice as large as that from Hekla in 1845, which is computed to contain 14,400 millions of cubic feet (Danish), and it dwarfs into insignificance the lava streams ejected during the eruptions of Vesuvius in 1794 and 1855, which have been computed at 727 and 567 millions of cubic feet respectively. Only once since the settlement of Iceland has a larger one flowed forth, and that was from rifts which opened in, and adjacent to the Varmárdalr ("warm-river valley") near the Skáptarjökull on the west side of the Vatna. This lava-flood is erroneously stated by all previous writers to have flowed from the Skáptarjökull, where, it is positively asserted by Herra Thorodssen, an Icelander who has made the volcanoes of his native land his study, an eruption has never yet occurred!

I think it but right to add that Professor Johnstrup computes the bulk of the lava-bed in the Öræfi at 10,000 of millions of Danish cubic feet only; a ridiculously low computation, especially as the Professor gives the length of the bed from north to south at three Danish miles, and says that "its average breadth can be set down at a quarter of a Danish mile, and its depth along its borders from 10 to 15 Danish feet."

I am able to give the following particulars of the eruption in the Öræfi, for which I am indebted to Jón of Reykjahlíð, the nearest inhabited house to the scene of the outbreak; where, by-the-by, I stayed last summer, when I bagged four reindeer—the first, it is believed, of those animals that have fallen to an Englishman's rifle in Iceland.

Lava was first seen issuing on the 18th February, forty-six days after the earthquake; but it is probable the fiery flood commenced to stream forth immediately after, no one having crossed from Reykjahlíð to the eastward, or *vice versâ*, during that period, but little travelling naturally being done in Iceland during the winter. For nearly four months the lava continued to stream forth more or less freely, and then ceased to flow until the 15th August, when a smart shock of earthquake was felt and a slight eruption of ashes and bombs took place—the only eruption of ashes at this spot. This eruption, I believe, was the one witnessed by Mr. Watts, and described in the above-mentioned paper and in his book 'Across the Vatna Jökull.'

I will now proceed to give my reasons for asserting so positively that the earthquake which opened the rifts in the Öræfi was caused by an explosion in Askja, and that the lava came thence through a subterranean channel. Steam and smoke were seen ascending from Askja immediately after the earthquake, and explosions continued to take place there with such violence and frequency, during the whole time that lava was flowing forth in the Öræfi, that that exceptional and enterprising Icelander after whom the pass to the crater is named, Jón of Vidrkær, induced some of the peasants living on the borders of the desert to accompany him to the volcano in the month of February, the coldest month of an Icelandic winter. Moreover, *while no lava was erupted from Askja itself*, pumice (which is believed by geologists to be a scum which forms on the surface of molten lava) was ejected there, and only an infinitesimal quantity in the Öræfi; the quantity of pumice from Askja was prodigious, and proportionate to the magnitude of the lava-flood, which, I contend, came thence. Professor Johnstrup reported that 150 Danish (= 3000 English) square miles of country east of Askja were buried under a covering of pumice varying in depth from two inches near the coast to several feet at the base of the Dýngjufjöll. This, however, was only a tithe of what was ejected, the bulk being carried out to sea, some, as before observed, even being borne so far to the eastward as the inland districts of Sweden.

The beds of basaltic and doleritic lavas bared in the face of the cliffs bordering the hot-water lake in Askja are irrefragable proofs that a huge cauldron-shaped hollow formerly existed here, which has been filled up to its present level by lava-floods that have issued therefrom and spread one over the other. It is reasonable to believe that in the course of time these vast deposits first narrowed and then entirely blocked up the vent or vents whence the lava issued, so that in 1875 it required less force to upheave, at a lower level by some 2400 feet, the rocky roof of an old channel * running under the Öræfi, than to force a vent through the lava deposits in Askja itself. To judge from what occurred at both places it is probable that the force required to open the rifts in the Öræfi and that necessary to force an outlet through the old crater were nearly equal, and that at the same moment the rocky strata lifted in the desert, the huge oval mass that has sunk in Askja was also forced from its bed. Naturally, vents having been formed in two places, the heavier molten matter would flow from those at the lower level, while the steam and gases would make their escape, carrying with them the lighter substances such as pumice and ashes, from the vents at the greater altitude. The latter, moreover, would act in a manner as safety-valves, and the molten lava, not being subjected to any great pressure from confined steam or gases, by its own gravity would well gently forth through the newly formed vents at the lower level, instead of being forcibly hurled far and wide by the enormous pressure of confined steam and gases generated above it, as most certainly would have happened if the "safety-valves" had not existed.

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* The course of this channel is in all likelihood marked by the depression in the Mývatns Öræfi running in a N.N.E. direction, named the Svinagjá (? "swine-rift"), as at the spot where a line drawn from it would intersect the bed of the Jökulsá, a river east of the Öræfi, there is a group of small new-looking craters, and the surface of the earth has been greatly disturbed by earthquakes in modern times.

The displacement whence the lava issued in 1875 is in the Svinagjá.

Fortunately for the inhabitants of the north-easterly part of Iceland this is exactly what occurred, as we have seen.

The shock of earthquake on the 15th August and the slight eruption of ashes in the Öræfi are, I think, easily accounted for. It is extremely likely that a quantity of water had been gradually collecting in the hollow in Askja, now the bed of the lake, and that at this time it suddenly found its way through a newly opened fissure into the abyss beneath, in which the molten lava had then fallen so low that its surface was lower than the level of the roof of the subterranean channel connecting Askja with the Öræfi, that the steam generated caused the shock of earthquake and forced out the pumice and other substances forming a scum on the lava in the channel. The fact that the lava had ceased to issue for some time previous to this shock of earthquake confirms the view taken, that the channel was only partly filled with lava so that a scum could form upon that lying therein; and from what was taking place in Askja a month earlier, when Mr. Watts was there, it is not very speculative to imagine that a fissure was newly opened and that through it the water from the snows, rapidly melting under the summer sun, found its way into the heated abyss.

In conclusion, it cannot be questioned that Askja is justly entitled to be considered Iceland's largest volcano, notwithstanding that no earlier eruption there than those of 1875 is recorded, and that prior to February of that year it was not known that the largest mountain-mass amidst the Ódáđahraun encompassed an almost circular crater having an area of at least 23 square miles. Those "hardy Norsemen" who sought a home in Iceland rather than abandon the pagan religion of their forefathers at the behest of a king, thoroughly explored their island home, and there can be no doubt visited this crater. This is conclusively proved, I think, by the name given to the mountains around, Bower-mountains; the bower being the crater Askja. In the course of time the verbal accounts of these early explorations became forgotten lore, and as nothing was to be gained by venturing into a wilderness of igneous rock, the interior of Iceland east of the Sprengisandr ("bursting-sand") became a *terra incognita* to the listless, apathetic, yet kind-hearted and hospitable modern Icelanders, till Jón of Vidrkær in 1875 and Mr. Watts in 1876 showed that the lava-desert was not so impassable as was believed. Although a decade seldom passed away without a volcanic eruption in the interior, no one was ever bold or curious enough to visit the spots where these took place until Jón of Vidrkær did so in 1875; and it was but seldom the trouble was taken even to record the date or duration of an eruption. Volcanic eruptions in Iceland invariably take place in thick weather, and are attended with the emission of immense quantities of steam; accordingly, from the inhabited coast region (it is believed that in Iceland there are only two inhabited houses distant 40 miles from salt water) it is impossible to tell, if the scene of the eruption is any great distance off, the exact spot where it is taking place. Therefore it is hardly to be wondered at that in the annals of Iceland we find no mention of any eruption among the Dýngjufjöll. Eruptions that took place among the mountains in the desert were mostly placed to the credit of the Trölladýngja; consequently we find it stated that this volcano erupted in the years 1151, 1188, 1340, 1360, 1389, and 1510. In 1341 and 1510 we also find it mentioned that Herđubreiđ ("the broad-shouldered"), a mountain 12 miles north-east of Askja, erupted; but Professor Johnstrup, who has examined Herđubreiđ, says this cannot be correct, as it is not volcanic. In 1477 and 1598 great eruptions of sand and pumice took place from some volcano or volcanoes in the interior, but it is not recorded which. These were followed in 1618, 1862, and 1872 by violent earthquakes in the north; and in 1638, 1744, and 1862 we find it on record that flames were seen ascending in the desert. It is highly probable that some or most of these eruptions took place in Askja, as it is certain from the present state of this immense crater and the outer slopes of its encircling mountain wall that they have been the seat of eruption after eruption during historical times. The flames that were seen ascending from the desert doubtless marked outbursts of lava from channels radiating from Askja underlying the Ódáđahraun, similar to the one that burst forth in the Mývatns Öræfi in 1875. That such did issue at about the times mentioned the newer lava-floods seen on the way to Askja conclusively prove.

GEOGRAPHICAL NOTES.

Arctic Expeditions of the present Summer.—The expedition appointed by the United States Government for the search and relief of the *Jeannette*, sailed in the *Rodgers* from San Francisco, on the 16th of June. The vessel is a full-rigged barque of 420 tons, heavily sheathed with three-inch oak-plank and otherwise strengthened for ice navigation. The commander, Lieutenant R. M. Berry, has had previous Arctic experience whilst with the *Tigress* in the search for the *Polaris*. Thirty-five officers and seamen sail with him and the vessel is provided with stores for four years. After passing through Behring Strait, the instructions of the expedition are to cruise along the Siberian coast, communicating with the natives and endeavouring to obtain tidings of the missing vessel. From Cape Serdze Kamen the *Rodgers* is to proceed northward to Herald Island, hunting for cairns. Should no clue be met with up to this point, leading in a different direction, she will next direct her course towards the southern shore of Wrangel Land, and select a suitable shelter for wintering, and as soon as the ice is hard enough, sledging parties will be sent out in various directions. If no news be obtained of the *Jeannette* or her crew by the termination of the second season, the Search Expedition will return to San Francisco.—The U.S. revenue cutter *Corwin* sent earlier in the season to obtain tidings of the *Jeannette* and the two missing whaling vessels *Vigilant* and *Mount Wollaston*, has been heard of from East Cape. The whaling vessels had been found by the natives near East Cape, one of them with three corpses on board, the other without remains of the crew or any sign of life.—Two other Arctic expeditions have been fitted out by the United States Government during the present summer, one to Point Barrow in the Arctic Sea, on the northern coast of Alaska, having for its object the establishment of a station for meteorological, magnetic, and other observations in accordance with the programme of the International Polar Conference which met at Hamburg in 1879; and the other to Lady Franklin Bay, near the coal seam discovered by the expedition under Captain Nares in 1875. The Point Barrow station is to be maintained until the summer of 1884, communications being kept up with it by a vessel to be despatched thither every season. It is under the command of Lieutenant P. H. Ray, of the U.S. Signal Service. The expedition up Smith Sound has the double object of founding a similar international station for scientific observations, and of carrying out a scheme of circumpolar exploration. It is to return in the summer of 1883, and is under the command of Lieutenant A. W. Greely; the whole party consists of twenty-four officers and men of different branches of the U.S. military service.—The little Dutch exploring vessel *Willem Barents*, now on her fourth Arctic voyage, when last heard of was at Vardö, having put into this port on the 20th June, after an attempt to push northward on the meridian of the west coast of Spitzbergen. The pack, however, proved to be very low this year, and the highest point reached was 74° 15′ N. in about 14° E. long.; it had been impossible to reach either Jan Mayen or Spitzbergen. The intention is next to try the Kara Sea in the direction of the mouths of the Ob and Yenisei, and early in September to steer a course toward Franz-Josef Land.—Our Gold-Medallist Mr. Leigh Smith sailed from Peterhead on his fifth Arctic voyage in the third week in June. On reaching Eira Harbour in Franz-Josef Land it is his intention to construct a house and refuge, the materials for which he carries with him, and he will afterwards try to get as far north as possible. He has twenty-five seamen and assistants with him, and carries provisions for fifteen months.

The Ogowé and Congo Routes to Stanley Pool.—We have already * given a brief sketch of the remarkable journey which our Associate, M. Savorgnan de Brazza, made last year from the Ogowé to the Congo; a letter addressed by him to a relative, under date of March 4, 1881, now enables us to add some further particulars, which are of considerable interest, in regard to the relative merits of the Ogowé and Congo routes to Stanley Pool. On setting out on this journey, M. de Brazza's instructions were to select the best positions in Central Africa for two stations of the French Branch of the International African Association, one of which was to be on the Upper Ogowé, and the other in the most favourable spot for enabling France to bring her civilising influence to bear in the direction of the Upper Congo. The ulterior object of his expedition was to launch steam-vessels on the navigable part of the Congo, and to organise a trade-route between some point on this great waterway and the Atlantic coast. The station founded at Ntamo (Stanley Pool) is intended as the starting-point of the steam-vessels which are shortly to be placed on the Congo, while that on the Passa affluent of the Upper Ogowé is the nearest point to the Congo which could be placed in direct communication by water with the Atlantic Ocean, some 435 miles distant. On his first expedition it took M. de Brazza two whole years to reach the Passa, which was previously unknown, and the obstacles to free commercial intercourse on the Ogowé were great, as the river was divided into three distinct sections, held respectively by the Inenga and Galoa tribes, the Okandas, and, lastly, the Adumas, each of whom exercised absolute control over their own section, so that three changes of porters and canoes were necessary, and the value of merchandise was thus enormously enhanced. But during his last journey M. de Brazza put an end to this arrangement which had existed from time immemorial, and made the navigation of the river free as far as Franceville, his station on the Passa. With regard to the 180 miles of land journey thence to Ntamo on the Congo, porters will be found as easily along the road as they are on the banks of the Ogowé, for the population is very dense and peaceable, and the surface of the country presents no serious difficulty; indeed, were it not for some obstacles in the first three days' march, a wheeled vehicle might pass along the road without any preliminary labour being necessary. The country, moreover, is very healthy, as it consists of a plateau at an elevation of 2625 feet, and this altitude affects the vegetation beneficially, so that the banana and maize flourish there. But this line of land communication from one station to another is only a provisional expedient, for the route to be used in the future will touch the Congo at a point much nearer to Franceville. This route, by which the steam-vessels will pass down to the Congo, is the river Alima, which in his former expedition M. de Brazza discovered at a point only 45 miles from the Ogowé. The tract of country between Franceville and this point on the Alima is not difficult, and, indeed, is almost practicable for laden waggons without any previous labour being expended on it. Having traversed it five times already, M. de Brazza is able to speak confidently on the subject. The country is not wooded, and the vegetation is sparse; the hills have a gentle slope, and a wheeled vehicle could pass everywhere. The following is the work that will have to be done. A road must be cut through a forest for some three or four miles after leaving the station, and another for about a third of a mile a little farther on; a bridge must be built over the river Koni, which is 80 feet broad and six feet deep; and besides there are difficulties from steep inclines in five or six places. M. de Brazza appears to think that a sufficient number of porters can be procured locally for the transport of merchandise and steam-vessels in sections. Afterwards asses might be made available, and later on the five or six difficult places mentioned above might be made practicable for wheeled vehicles by native labour, and at no great expense. M. de Brazza justly prides himself on having been able to accomplish, without violence of any sort, the total abolition of the slave-trade in the basin of the Ogowé. Franceville has already become a place of refuge for escaped slaves, and M. de Brazza states that all the tribes along the river recognise this right of asylum, and admit that all slaves who place themselves under his protection are thereby made free.—Speaking of Mr. H. M. Stanley's operations on the north bank of the Congo, M. de Brazza expresses the conviction that he will not be able to transport his steam-vessels to Stanley Pool in less than four years, and that his roughly made road will never become a practicable highway; while the farther he advances the more difficult will he find the solution of the revictualling question, as the country he passes through will furnish but little in the way of supplies, and even at his present early stage he has to employ sixty mules and asses to bring up provisions. To give an idea of the difficulties of transport up the rapids and falls of the Congo, M. de Brazza explains that in a former geological age an immense plateau at an elevation of more than 2000 feet above the level of the sea separated the Upper Congo from the Atlantic; the river wore a bed for itself through this plateau, which at last, by the action of constant and continuous drainage, became furrowed into as many valleys as there were torrents rushing down into the great river. In following the line of the Congo, therefore, it becomes necessary to cross all these chains of mountains, which are the remains of the ancient plateau. The difficulties of this route are so great that the salt taken to Ntamo (Stanley Pool) is never transported by it, but by a much longer and less difficult road. Naturally, then, M. de Brazza institutes a comparison between the two routes from the Atlantic towards the Upper Congo, favourable to the one he has chosen. By the line of the Ogowé the river is made use of as far as it is navigable for canoes, from which point it is but 40 or 45 miles through an easy country to a point where the Alima is navigable for steam-vessels. On this line, too, labour and provisions are drawn from the country itself, while on the Congo nothing but rocks and dry grass are to be found. Not only are the men of Mr. Stanley's expedition fed on rice from Europe transported on the backs of porters and mules, but the animals themselves are fed on hay and oats obtained from Europe at a heavy cost. On the Ogowé porters and workmen are all natives, but on the Congo M. de Brazza states that they are obliged to make use of men from Zanzibar and slaves, purchased by Mr. Stanley, who after all do not do much work for him. In spite of the precautions taken, many of these slaves escape, and numbers have had to be recaptured in the neighbouring villages, where they had taken refuge. No labour is done there, M. de Brazza adds, by free natives, with the exception of a few trade-porters who have consented to give temporary assistance in getting up the waggons. At Franceville, on the other hand, the neighbouring villages sent men to build the houses, and when M. de Brazza in July of last year had to send down to the coast for supplies, the 750 Adumas who manned the canoes were only accompanied by one European and two Gaboon men. The natives here are paid in goods after working for three or six months. Sufficient labour could be procured on the spot to carry out any works between Franceville and the coast, as well as between the Ogowé and the Alima, and this essential difference between the two routes is due to the Ogowé region being well-peopled and the country fertile and new to European merchandise. On the Congo, on the other hand, the population is very scattered, the country sterile, and European goods have long been known. M. de Brazza further states that the *personnel* of his expedition consists of twenty men from the Senegal or Gaboon, and two Europeans only, while Mr. Stanley, with fourteen Europeans, has already expended 80,000*l*., and it is quite impossible to say what further expense will be incurred in carrying out his work. The total sum which M. de Brazza has expended on his expedition amounts at the present time to 1800*l*. Of his two stations, that at Ntamo is only just started, and he is now going to revictual it, but that on the Ogowé is in every respect in a flourishing condition as regards houses, stores, arms, provisions, &c. Towards the conclusion of his letter, M. de Brazza mentions that he is waiting for the expedition organised with the 4000*l*. voted by the French Chambers. This is to take him the steam-launches to which he has before referred, and he was much disappointed at not finding them at the Gaboon on his arrival from the Congo in December last. By last advices the expedition, consisting of Dr. Ballay and M. Mizon, had arrived on the coast, but we fear that the enterprising young traveller who is waiting for them with so much impatience will be disappointed in his expectation of seeing them at Franceville at an early date, for in a letter written from the Gaboon on May 4th, and published in *Les Missions Catholiques*, Père Delorme states that it will probably be several months before they are able to ascend the Ogowé to the Passa.

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* *Ante*, p. 359.

The Manabi Route from Quito to the Pacific.—In our report of the proceedings of the Geographical Society of Paris on February 4th (*ante*, p. 184) reference was made to a communication by M. Edouard André on M. Ch. Wiener's recent journey from Quito to the Pacific coast, in search of a shorter and more convenient route than the one now used by way of Chimborazo, Guaranda, and Babahoyo to Guayaquil. This communication has since been published, illustrated by a map, in the

March number of the *Bulletin*, which has just reached us. M. André points out that M. Wiener was not the first to follow and examine the route in question, and that it has long been the subject of investigation. In 1871–3 MM. Reiss and Stübel, the German geologists, traversed this region, and they published* the altitudes of the principal points on the road. Again in 1875, Père Menten, a distinguished astronomer and the founder of the present Quito Observatory, visited the slopes of El Corazon (Chamalari) in the direction of the Pacific, and followed the same route as M. Wiener as far as Santo Domingo de los Colorados, travelling by way of El Mirador. He determined astronomically the position of the chief points on the road, besides taking altitudes barometrically. His observations have never been published, but he furnished M. André with the table of heights, which we reproduce at the end of this Note. The road has, moreover, been the object of special study on the part of the contractors who made it, from Aloag to El Mirador, and, with the exception of its extreme end, it is not reduced to a mere footpath, as M. Wiener appears to make out. It is everywhere easily passable, and from Aloag to San Florencio is in very good condition; and in saying this, M. André speaks from his own personal experience of the road in June 1876. On another occasion he proposes to give the Society an account of his journey, and in the meantime supplies the map referred to, in order to establish the priority of discovery as claimed above. This map, which has been prepared from the observations of the three travellers named before, and from the bearings taken by M. André, gives the line of the road at present used by the workmen of the Miligalli saw-mills, by the agricultural labourers of the district, and by the members of the German colony in the Cordillera de los Colorados. M. André maintains that a road could be made fit for wheeled vehicles as far as El Mirador, and thence to the sea, by prolonging the line over the Cordilleras de Toachi and de Sandomo (which, he says, are not so easy to cross as M. Wiener thinks) to the Rio Tosagua, which would have to be followed to reach Bahia in the Bay of Santa Marta.—Surveys have been made in all directions in Ecuador in order to settle this vital question of a land-route from Quito to the coast. In 1861 two Frenchmen, MM. Daste and F. Gouin, surveyed a line between the capital and the Bay of Pailon, to the north-west, by way of the forests of Malbucho and the Rio Mira, in which task they were aided by eighty Indians. The result of this survey was, that the route followed by MM. Daste and Gouin was quite practicable, and the road would have been made but for want of funds. Later on the President of the Republic, Don Garcia Moreno, directed M. Géhin, a French engineer, to make a road from Quito to Guayaquil. The work was actively carried on until the death of Moreno, after which the remainder was left in its old state, that is to say, from Guaranda to the west of Chimborazo, it presents a constant succession of mudholes and quagmires. Other projects were afterwards brought forward, but none was received with more favour than the Manabi road, to which M. Wiener has once more called attention. M. André, in conclusion, hopes that his investigations will be more carefully made than those of his predecessors, and that we shall have an exact survey of the road already traced by others, unless in the part between El Mirador and the sea M. Wiener has attempted to find some other track through the virgin forest than the existing foot-paths — a task which M. André looks upon as almost impossible of execution in the twenty-one days occupied by his journey from Quito to the sea.

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* 'Alturas tomadas en la Republica del Ecuador,' by W. Reiss and A. Stübel. Quito, 1873.

Heights above Sea-level on the Road from Quito to the Province of Manabi.

1. *According to Reiss and Stübel* (1871–3).

	In Metres.	In English Feet.
Quito	2850	9,351
Santa Rosa (top of the road)	3086	10,125
Tambillo (cottage)	2802	9,193
Aloag (village)	2922	9,587
Paguangalli (highest point on road)	3469	11,381
El Pungu (upper limit of arborescent ferns)	3279	10,758
Ligüe	2850	9,351
Garretas (saw-yard)	2477	8,127
Rio Silante	2150	7,054
Rio San Lorenzo (Bridge of Maranjal)	1787	5,863
Canzacoto	2005	6,578
Rio Yamboya (bridge)	1849	6,066
Upper limit of banana trees	1630	5,348
San Florencio (Hacienda)	1459	4,787
Rio Calulo	1291	4,236
Foot of Mount Guanasa	1245	4,085

2. *According to Père Menten* (1875).

	In Metres.	In English Feet.
Aloag	2922	9,587
Concepcion	2955	9,695
Pucal	3193	10,476
Paguangalli	3440	11,286
Miligalli (saw-mill)	1900	6,234
Canzacoto	2004	6,575
Rio Yamboya	1819	5,968
San Florencio	1580	5,184
Cascajal	1377	4,518
Playa de Guanasa	1237	4,058
Quebrada Calulo	1086	3,563
San Nicolas	1086	3,563
Rio Napa	917	3,009
Toachi	785	2,583
Allulliqui	668	2,192
Tante	576	1,890
Guanasilla	497	1,631
Mirador	588	1,929

The Boundary Line between Chili and the Argentine Republic.—According to news just received from Buenos Ayres, a satisfactory solution of the question of the boundary in the south between Chili and the Argentine Republic has been arrived at through the good offices of the representatives of the United States in those countries. The Andes is to be the dividing line stretching south across the Straits of Magellan to Mounts Sarmiento and Darwin. The Argentine limit in the Atlantic is to be Virgin Cape at the entrance to the straits, and the southern limit of the republic will be defined by a line drawn thence to a point on the Andes in 52° S. lat., 72° long. west of Greenwich, so that the region watered by the Gallegos, Santa Cruz, and other rivers will become definitely Argentine territory. The coast of the Straits of Magellan will thus be given to Chili, while Tierra del Fuego and the adjacent islands will be divided according to the Andes line. The straits will be declared free to the vessels of all nations, and the two republics will bind themselves not to place armaments of any kind either at the entrance or on the shores of the straits. A money compensation is to be given for whatever territory the establishment of the dividing line of the Andes may take from either country.

Recent News of Russian Travellers.—We are indebted to our Associate, M. Alexis de Lomonossof, Assistant-Secretary of the Imperial Geographical Society of St. Petersburg, for the following items of information respecting Russian travellers.—After delivering a course of lectures on his explorations in Central Asia, Colonel Prejevalsky has retired to his native place in the Government of Smolensk, where he is now engaged in writing his account of his last journey. This work will be finished in November, and probably published next February.—M. Severtsof has been engaged in comparing the results of his last journey * in the Pamir with his previous explorations in Central Asia, and will write a paper on the subject with the view of connecting his levelling from the north with that of Captain Trotter from the south.—Dr. Regel, the eminent botanist, has gone to Ferghana, and is making collections in medicinal botany in that region.—M. Malakhof, an accomplished young ethnologist, is engaged in the examination of caves in the Governments of Viatka, Perm, and Ufa, in connection with his investigations on the subject of the antiquity of man. He is a good photographer, and will, no doubt, find this art of great value in his present researches.—M. Poliakof started in May in the ship *Nijni Novgorod* on his expedition † to the Island of Sakhalin (Saghalien). He is accompanied by M. Nikolsky, and will be chiefly occupied in investigations in the department of zoology, but during his stay of two years he will also prepare an account of his general observations in the island.—M. Adrianof, of the University of St. Petersburg, has gone with a small party to Western Siberia, and is now engaged in studying the geography and geology of the Kuznetsk district.—The committee entrusted with the arrangements for taking meteorological observations at the mouth of the Lena within the Arctic circle, have decided upon a plan of operations. M. Jurgens, an officer in the pilot service of the Russian Navy, has, as we have before stated, been appointed chief of the station. He is a man of hardy constitution, and likely to be able to withstand the severity of the climate of the *tundra* region. He is to leave St. Petersburg during the month of August, and after spending some time at Irkutsk, will reach Yakutsk during the winter. There he hopes to be able to organise the expedition, and to proceed in a steamer to the mouth of the Lena in the spring of next year.—The Imperial Geographical Society is now engaged in forming a collection of geographical and other scientific objects for the Exhibition at the approaching International Congress at Venice. M. Grigorief, Professor of Botany at the Technological Institute, who was wrecked in the *Nordenskiöld* off the Japanese coast last summer, has been appointed Russian Commissioner at the Congress.

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* See vol. ii. p. 499.

† See *ante*, p. 113.

A Journey in the Chinese Province of Kansu.—A long letter has been communicated to *Les Missions Catholiques* from M. Janssen, a Roman Catholic missionary stationed at Lan-chow-fu, descriptive of a recent journey through part of the Kansu province, which furnishes some useful information respecting that little-known region. From Lan-chow M. Janssen pursued a south-easterly direction to Tsin (or Chin)- chow, which he reached in eight days. This town is situated in a charming and very fertile valley, on the banks of the river Hui, one of the numerous affluents of the Hwang-ho, and a considerable export trade is done there in tobacco, cotton, and wine. To his surprise, M. Janssen found the streets of the town well paved, an unknown luxury in all the Chinese towns he had previously visited. The next day he resumed his journey to the south in the direction of Hui-hsien, but the roads were so bad that it took him four days to travel about 80 miles. The country, however, was very beautiful; some 10 or 15 miles beyond Tsin-chow, the road left the plain and rose gradually to the Tsin-lin range. Everywhere there was abundance of timber of all kinds, shrubs, and creeping plants; but the surface of the country is cut up by torrents to such an extent that the roads are impracticable for ordinary commerce, and in many places everything has to be carried on men's backs. Hui-hsien, which contains 15,000 inhabitants, is situated in a broad valley on the slope of a hill; its walls are in good preservation, and the town is even cleaner than Tsin-chow. M. Janssen next proceeded to Yü-êrh-ngai, which is 23 miles south of Hui-hsien, on the Nan Shan, a lofty and stony mountain range. For the first 10 miles he travelled through a charming, undulating country, well cultivated and thickly peopled, which reminded him of some of the beautiful spots in the neighbourhood of Brussels. Maize and sorghum are the chief productions of the country, which is also the home of the persimmon or date-plum, the delicious fruit of the *Diospyros Kakli.* As soon as the Nan Shan was approached, the road became more difficult, and constant rains had made it even worse than usual. Leaving Yü-êrh-ngai, M. Janssen retraced his steps down the Nan Shan, in order to visit Lu-tsze-ngai, after which he went to Chung-pa-miao by way of Hui-hsien and Liang-tang-hsien. The last-named town is 30 miles from Hui-hsien, and Chung-pa-miao is 23 miles farther on and to the south-west. M. Janssen afterwards visited the small town of Kwan-kia, about 12 miles south-east of Chung-pa-miao, and on his way back to Lan-chow, he went to Mo-tieh-kow, in the Wu-tsai district, three days' journey to the north-east of Liang-tang-hsien. At this place he found a colony of emigrants from Szechuen and Shensi, who had been induced to settle there on account of the low price of land among the mountains of the Kansu province.

The Direct Road from India to China.—In the Journal * of the Asiatic Society of Bengal, our Associate, Mr. S. E. Peal, whose brother accompanied Mr. H. L. Jenkins † in 1869 in his trip across the Patkoi range into the Hookoong Valley, describes a journey which he undertook for the purpose of exploring the Nongyang Lake on the Burmese side of the water-parting and of reporting on the pass over the Patkoi, which is considered the most feasible and direct route from India to China. Mr. Peal's paper furnishes a very detailed account of this expedition, and is illustrated by a map and plates. The configuration of the whole country and the ranges around being considered in regard to the countries beyond, he thinks that the only feasible route is viâ the Kamrup basin and Nongyang or Loglai. To the east, not only does the Patkoi increase in elevation, but the approaches from either side become more and more difficult, and the country is besides uninhabited. On the west, too, the hills are more difficult, the water-parting at a much higher elevation, and the tract of mountainous country much wider. Mr. Peal thinks it would not be difficult to discover the route actually used in olden times, as its locality is known; and it is possible "that in ascending some one of the actual gaps in the lower part of the range east of the present pass, and not more than two or three miles distant, the path may be found to debouch almost at once on the level, or but little above it, rendering a route anything but difficult to open there." He thinks that the elevation cannot be more than 600 or 800 feet above the tributary of the Loglai first met with, that river itself running at about 1000 feet below the crest. There is said to be reason for believing that this old route was in use as the "Doi bat" in 592 A.D. by the earliest Shans from Mogong.

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* Vol. l., Part ii., No. 1, 1881.

† See R. G. S. Journal, vol. xli. p. 342.

From the Irawady to the Yang-tsze.*—A road across the Kakyen hills on the Burmo-Chinese frontier, into the Shan states of Yünnan, which has been closed for a long time, was last year reopened for trade; and one caravan having already made use of it, Mr. Henry Soltau and Mr. J. W. Stevenson, of the China Inland Mission, who have been stationed at Bhamô since 1875, determined to accompany the second caravan on its return journey into China. Their chief reasons for taking this route were that it lay through territory belonging to Kakyen tribes friendly to them, and that they could perform the whole journey by land. They started from Bhamô on November 29th, 1880, having engaged two Kakyen chiefs, old friends of their own, to be responsible for them in crossing the hills, and to help to carry their load of medicines and books. They joined the rear of the caravan, where they found the majority of the Kakyen chiefs, all mounted on diminutive mountain ponies. The other chiefs headed the procession, together with a few Chinese merchants, who were taking goods back with them. Then followed the long string of ponies and mules—between 500 and 600 in number—attended by Chinamen, Shans, and Kakyens, each having charge of three animals. These men carried no arms, but were guarded by Kakyens, who marched alongside armed with spears, matchlocks, and sword-knives; every chief carried his sword-knife, usually silver-mounted and ornamented with a tuft of dyed goats' hair. The roads being mere pathways, the caravan had to march in single file, and nearly two hours consequently elapsed every day between the starting of the first and last animals. One hundred Kakyen villages had representatives in the company, which included over forty chiefs. Some danger was apprehended in the jungle outside Bhamô, as the Kakyens knew that there was a gang of men from some strange villages lying in wait for them. The camping-place was, however, reached in safety, the guards posted by the Burmese officials having kept strict watch at every turning. The scene here was a busy one, everybody being occupied in removing the loads of cotton, salt, and piece-goods from the animals' backs, and placing them in hollow squares, in the centre of which the ponies and mules were tethered; the men camped outside under the shelter of the trees, or in booths made of branches and bamboos. Nothing of importance occurred until noon of December 1st, when the caravan halted to rest on the summit of a hill which formed a plateau surrounded on three sides by still loftier hills. The caravan had now quitted the territory belonging to the Cowrie tribe of Kakyens, and had entered that of the La-kums, two or three of the principal chiefs of whom were great friends of Messrs. Soltau and Stevenson. Here an attempt was made by some strange Kakyens to rob them of their ponies, &c., and what threatened to be a serious disturbance ensued. Eventually, however, the friendly Cowries and La-kums got the better of the attacking party, and the difficulty, which was explained to have its origin in some misunderstanding in Major Sladen's time (1867–8), was settled by arbitration. It was arranged that Messrs. Soltau and Stevenson should pay twelve rupees, and the villagers of Moung-wai entered into an agreement to allow them to pass backwards and forwards at any time without further trouble, though they would not guarantee the safety of any other foreigners who might pass through the district. The next morning the caravan started as usual, and there was no further serious trouble during the remainder of the journey. On December 4th, the last day in the hills, the caravan was brought to a temporary standstill by a demand for black-mail made by some Kakyens on the Chinese merchants. This was paid, and soon afterwards a bend in the road brought them into full view of the lovely Shan plain of Kang-ai or Moung-la. Mr. Soltau gives the following description of the scene which here met his eye:—

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* We are indebted to Mr. Wm. Soltau, Assistant Secretary of the China Inland Mission, for copies of Mr. H. Soltau's letters, from which this account of his journey has been compiled.

"Two parallel ranges of hills enclosed a vast plain some 40 miles in length, and three to five miles in width, the hills meeting at either end. Every inch of ground was utilised by the industrious blue-coated Shans, the portions not occupied by the numerous villages, surrounded by their hedges of bamboos, being cultivated with paddy. As the view burst upon us that afternoon it seemed to me one of the most unique and lovely sights I had ever witnessed. We had just emerged from the wild, uncultivated mountains, with their wilder inhabitants, and here lay at our feet a golden plain bordered on either side by purple hills. Upon this golden floor were corn-stacks dotted here and there, and running through it a lovely riband of the deepest blue, fringed with threads of the same, the Ta-ping river and its thousand mountain streamlets which irrigate the terraced fields. In and out, patches of the darkest green indicated the positions of the numerous villages hidden away amongst hedges of feathery bamboo. No wonder our companions, so long under the strain of anxiety, burst forth into singing and loud conversation. All was so charmingly smiling and beautiful. The plain had not long been reaped, and sheaves were being carried home to be threshed. Lazy buffaloes were walking round and round in a ring on the summer threshing-floor, with half-a-dozen youngsters on their grey backs. Bright-faced girls and sober matrons, with silver ornaments in their hair, ears, and on their arms and dresses, wearing marvellous turbans of dark cloth, looking like inverted funnels, and red and brown striped petticoats under their garments of blue cloth, were threshing out the rice with wooden pickaxes or flails of light bamboo. Others were shovelling the golden grain into the air, while the gentle breeze blew away the chaff. Men and women were tying up the threshed straw in bundles and conveying it home on the backs of mules and bullocks to serve for fuel or bedding."

Messrs. Soltau and Stevenson were hospitably entertained at the village of Kai-ing by a Shan chief, who is appointed by the Chinese to govern about thirty of the villages in the plain. When Major Sladen went through to Momein, he was of service to the expedition, and he produced for their inspection a well-worn letter from the leader, testifying how trustworthy and useful he had been on the occasion. On December 7th the party started again, and passed through many villages in the plain, the road winding in and out among paddy-fields and across streams or the dry beds of mountain torrents until Lung-chang-kai was reached. The next day they moved on to Kiu-chêng, a large town in the plain, where a great number of Chinese traders and others live, as it is the terminus of the Bhamô caravan road, and here they again met their Chinese and Kakyen fellow-travellers. At Kiu-chêng the goods are transferred to other animals, and taken into China Proper, the caravan with its Kakyen escort returning to Burma. On December 10th Messrs. Soltau and Stevenson started from Kiu-chêng, and leaving the Kang-ai plain, crossed some more hills, on which a few Kakyens were found. Just beyond this point a suspension bridge over the Ta-ping river was passed on the left, and the roads from Bhamô, viâ Manwyne, on the right bank of the Ta-ping here cross it and join the main road to Nan-tien, by which the caravan had travelled. Passing through one more plain, inhabited by Shans, Mr. Soltau and his companion commenced the ascent of hills, and from that time, until they struck the Hêng river, which flows into the Yang-tsze, they had not more than four or five days of level travelling. On December 11th they reached Têng-yüeh-chow, or Momein, situated in a plain shut in by mountains on all sides, and after spending two days there, ascended the steep mountain beyond to an altitude of 7500 feet. The next morning they crossed the Lung-chuan-kiang, or Shwa-li (often written Shue- or Shway-li), by an iron suspension bridge, and immediately ascending, after a long pull found themselves on the crest of a range 8129 feet (Gill) above the sea. From this point an extensive view was obtained of range after range of purple mountains, a perfect ocean of pine-clad hills, of all shapes and heights, whilst away down below on the one side of the ridge was the thin line of the river they had just left, and on the other the deep blue of the Lu-kiang, or Salween. A long descent through pine forests brought them to the halting-place for the night, a village overlooking the valley of the Salween, which has such an evil reputation during the wet season for its deadly malaria. The next day we descended to and crossed the river by an iron chain suspension bridge, 140 yards in length, built in two sections. The plain of the Salween is inhabited entirely by Shans, who appear to be less susceptible to the malaria than the Chinese, and of whom subsequently no more was seen.

The party reached Pu-piao, famous for its sulphur baths, on December 16th, and the important city of Yung-chang on the next day. On the afternoon of December 20th, they left the city, and after crossing the Lan-tsang-kiang, or Mei-kong, river by an iron chain suspension bridge, and travelling through lovely scenery, reached Chü-tung on December 23rd. They remained there until December 27th, visiting the half-ruined town of Yung-ping-hsien on Christmas Day. Three days' hard travelling through magnificent scenery, past several towns, villages, and hamlets, brought them to Hsia-kwan on the evening of the 29th. This important town, the key to the city of Ta-li-fu, is situated at the southern end of the Ta-li-fu lake, and is reached by a narrow pass spanned by a natural bridge, under which runs the river that drains the lake. The road follows the left bank of this river, through the bends of a magnificent gorge, which gradually narrows until it terminates in the steep cliffs which unite at the bridge of rock, and is there carried through a tunnel in the rock into the smiling plain drained by the lake. They spent one day in Hsia-kwan, moving on to Ta-li-fu on the 31st December.

Messrs. Soltau and Stevenson remained at Ta-li-fu until January 6th, 1881, when they started for Yün-nan-fu. The country traversed was but thinly populated, and the inhabitants poor and ill-clothed. The houses in some parts are flat-roofed, the rafters being covered with small sticks on which are placed mud and stones; this, when baked hard by the sun, forms a rain-proof and warm covering to the huts. Extensive forests of pine were seen in some parts of the district, while in others terraced hills, long uncultivated and uncared for, bore silent testimony to the former prosperity of the province. Some of the scenery that they passed through was magnificent; indeed, there was hardly a day when the travellers were not charmed with the beauties of nature in this hilly province. A succession of gorges, wooded to their summits, and drained by a noisy rivulet, would gradually open out, enclosing a lovely valley, terraced and cultivated with the emerald poppy, wheat, and beans; and then again the hills would close in and forest scenery, in all its wildness and solemn grandeur, would succeed. Nearing the capital, however, they were much struck with the desolate and barren appearance of the country, acres and acres of good land lying uncultivated; and every city, town, and village here, as in other parts of the province, bearing the sad marks of the frightful ravages of the Panthay rebellion.

Yün-nan-fu, 496 miles from Bhamô, was reached on January 21st, and three days later the party arrived at Yang-ting, after traversing a desolate region apparently full of mineral wealth. Here they left the main road, which leads to Kwei-yang-fu, in the Kweichow province, and striking due north, crossed an extensive plain, at the end of which they ascended a table-land to the town of Yang-kai. Travelling across bleak and barren mountains, in which were coal and iron mines and traces of copper ore, they came upon snow, and one day had to travel through a blinding snowstorm. The next city they reached (January 30th) was Tung-chuan-fu, between which and Chao-tung-fu (February 4th) the country at first was hilly and barren, but rich in metals. The inhabitants told them that there were only two seasons during the year; for six months the wind blows daily, and there is clear sunshine, and then come six months of rainy weather, when the sun is scarcely ever seen. Beyond this, a more sheltered district was entered, and the party followed the course of small rivers which wound in and out among the mountains. In the valleys and on the slopes of the hills were hamlets and small towns, prettily embosomed amongst groves of oranges and plantations of the wax-tree, with its apricot-like leaf. One very pretty spot was the little town of Fa-na, on a river of the same name, a dirty, rapid stream, which subsequently flows into the Yang-tsze. The town stands in a beautiful gorge, on the side of the hill, and part of the houses are built on poles overhanging the river. It is approached by a narrow path which winds down the steep face of the mountain; and a further descent led to a suspension bridge, by which the river was crossed, and then commenced a long ascent of three hours to the summit of a hill, on which were extensive coal-mines.

At Chao-tung-fu but few traces of the rebellion were seen, and with the exception of the capital, it appeared to be the busiest city in Yünnan; the people were well-behaved and apparently prosperous. The ranges of hills between this city and Lao-wa-tan, the frontier hills of Yünnan and Szechuen, proved to be the most difficult for travelling on the whole road from Bhamô. For five days Mr. Soltau and his companion had to climb up and clamber down the steepest of hills by narrow tracks that skirted dangerous precipices, steep ravines, and narrow ledges cut in the face of the rock. At one place the river they had been following suddenly disappeared from view and entered a hill, at the foot of which it was again seen emerging from the hill much increased in volume.

The last walled city in Yünnan was left on February 8th, and on the 11th they reached Lao-wa-tan, 756 miles from Bhamô, which was the end of the caravan road. Much to their regret, they were here obliged to sell their ponies, which had been given to them by Count Bela Szechenyi, and which they had brought with them from Burma. Although there is water communication by the Hêng river between Lao-wa-tan and the Yang-tsze-kiang, travelling by it is dangerous owing to the rapids; Mr. Soltau and his friend, therefore, walked for two days as far as the town of Tan-tow (lit. rapids'-head), and then proceeded by boat. Even from this point they had to descend several dangerous rapids, and at one place (Ma-tao-ki) were obliged to disembark and walk for three miles, to avoid an impassable rapid. They first struck Szechuen soil on February 14th, on the right bank of the Hêng river, about 2½ miles from Tan-tow and 34¼ miles from Lao-wa-tan. The boundary of the province on the left bank is 19 miles farther down, and is formed by a stream which flows into the Hêng river. On February 15th, seventy-nine days after leaving the Irawady at Bhamô, Messrs. Soltau and Stevenson entered the muddy waters of the Yang-tsze-kiang, 1756 miles from its mouth, and anchored at Ngan-pien, a town situated at the junction of the Hêng with the Yang-tsze, having travelled a distance of about 830 miles.

The General Topography of the Eastern Region of South Australia.—Mr. E. B. Sanger has lately forwarded to the Surveyor-General at Adelaide a report * on his preliminary examination of that part of South Australia which lies between the "Government Gums" (S. lat. 30° 15′)

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* A copy of this has been kindly supplied to us by Mr. S. Deering, Assistant Agent-General of South Australia.

and Cooper's Creek, and in describing this tract of country he makes his remarks under two heads, viz. general topography and geological structure. With regard to the former, with which we are more immediately concerned, Mr. Sanger notes that from The Gums to Manuwaukaninna the country consists of a series of stony table-lands with alluvial plains between them. The borders of these table-lands are generally higher than their centres, which at a distance gives them the appearance of flat-topped hills. The plains are intersected by watercourses—commonly dry—which flow in a westerly direction, and after a certain distance lose themselves or expand into what are called lakes. One or two of the largest of these is said to empty into Lake Eyre, and some of them, which are in low localities, have water all the year round, but when the rainfall has been small, as is often the case, for two or three years in succession, the water in them becomes salt and unfit to drink. This is explained by the fact that the flood-waters, by which they were filled, wash out from the rocks and hold in solution a large percentage of the chlorides, carbonates, and sulphates of sodium, calcium, and magnesium. After a new flood or heavy rain, however, the water in the lakes again becomes fresh. The most interesting feature in the table-land country from a geological point of view is the enormous effect of denudation. Every flood brings down a vast amount of detritus and deposits it over the plain, and in some places the alluvial deposits attain a thickness of 50 or 60 feet. Vegetation is comparatively poor on the table-lands, consisting of stunted shrubs and trees, but after rain grass springs up with extraordinary rapidity. On the rich alluvial plains, however, vegetation is most luxuriant, and the best pasture is found. North of Manuwaukaninna the appearance of the country changes completely; the stony table-lands disappear, and low ridges of dazzling white sandhills stretch away for hundreds of miles to the north and west. This is what has been termed the Central Desert of Australia, but no one who saw the region after a heavy rain would call it a desert, though during the long periods of drought it much resembles the Sahara. The sandhills have a general north and south trend, and it is worthy of note that the western sides are invariably sloping and the eastern sides abrupt—a peculiarity which has been caused by the prevalence of westerly winds in this region. Between the sandhills are flood-flats, periodically inundated by the overflowing of the creeks which wind through them. The flood-water is not of local origin, as in the table-land country above referred to, but is the result of heavy rains in the tropics far to the north. The surplus flood-water from the tropics backs down the Cooper, Diamantina, and the network of watercourses which connect them, and slowly fills the lakes and flood-flats. This overflow of tropical rains reaches annually as far down the Cooper as Coongie, but it is only an exceptional flood that causes the Cooper to run below Coongie, and fill the large lakes between that point and Manuwaukaninna, viz. Lakes Hope, Perigundi, and McKinlay. As a matter of course, in seasons of long drought these lakes become salt, though occasionally local rains freshen them, and fill the waterholes in the creeks.

CORRESPONDENCE.

The Dara'h of Nūr.

Sir,—Having, some twenty years ago, given a brief account of the Kāfiristān and its people, I naturally read Lieutenant-Colonel H. C. Tanner's "Notes" respecting them, which appeared in the 'Proceedings' of the Society for May last, with much interest. I must confess, however, that I was greatly surprised to find him mention the Dara'h of Nūr as "the valley of Noah," and "Hazrat Nur" as the prophet Noah himself.

Dara'h means a valley with a stream, of greater or less volume, running through it; consequently, styling the Dara'h in question "the valley of Dara Nur" is equivalent to calling it *the valley of valley of Nur*. The Dara'h of Nūr is mentioned in history eight centuries ago, when subdued by Sulṭān Maḥmūd of G*h*annīn. Bābar Bād*sh*āh also knew it, and described it in his Memoirs; and Abū-l-Faẓl also describes it; but its name has remained unchanged, and it is never called by any other name than Dara'h of Nūr.

Mr. W. Simpson, the artist, in a letter which appeared in the 'Proceedings' for December 1879, p. 802, headed "Dara Nur, or Dara Nuh," says that Major Tanner translates the name as "*valley of light*," adding thereto a note of interrogation. Mr. Simpson has, apparently, fallen into the same error respecting "the prophet Noah," and assumes that "the words Nur and Nuh are *so closely allied* that it is quite possible they may have become mixed." Such a mixture is not possible unless نُور (Nūr), and نُوح (Nūh), are "closely allied"; but they are, on the contrary, totally different, both in form and in meaning. I think the near proximity of the tomb, according to the tradition, of Mihtar Lām must have suggested the name of his son, Nūḥ, a Musalmān name in which there is no "*r*," and whom Musalmāns of these parts neither call "Noar" nor "Nur."

The word Nūr also occurs in Nūr-Gal; but Lieutenant-Colonel Tanner, I notice,* writes the first "Núr," and the other "Nurgal," but the original is the same in both instances. This, likewise, is neither known as Noah Gal nor Núh Gal.

In my 'Notes on Afghanistān,' I have given an account of the Dara'h of Nūr, and have quoted the native authorities I have referred to. In his paper, Lieutenant-Colonel Tanner, in reference to the Kāfirīs, says, "Where again are the Párun?" The Dara'h of Pārūn will be found described in my 'Notes.' Since I published my account of the Kāfiristān, I have acquired much additional and very valuable information respecting it and its inhabitants, which I have embodied in the work in question. There are several "*proper roads*" leading into the Kāfiristān, which will also be found therein. "Chapar Serai" is, apparently, an error for Chaghān Sarāe. Chag̱hān is Turkish for white.

Lieutenant-Colonel Tanner may certainly be said to have gained a distant sight of the promised land, for from the point he reached, namely Aret of the Kohistānīs, the Kāfiristān can be seen; but, like Moses, he was unfortunately not destined to reach it, and, consequently, our knowledge of the Kāfiristān and the Kāfirīs rests, as heretofore, entirely on native information.

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* 'Proceedings,' Nov. 1879.

It would have been better to have left the "Tajiks" unnoticed instead of styling them Dārds for "convenience," as Lieutenant-Colonel Tanner has done, because they are totally distinct. Dihḳān or Dihgān and Tāj*n*īk are equivalent.

In the discourse which followed the reading of Lieutenant-Colonel Tanner's paper, Mr. Seton Karr said "He would be glad if some one would enlighten him on one or two points. For instance the word Spin was used," and that it occurred in the name of the "Spin Tarins." As no one appears to have furnished the information, I may mention that *spin* is the Pus'hto for *white*, and that *tor* is *black* in the same language. Spīn also occurs in Spīn-Ghar, which Tāj*n*īks call Safed-Koh. The Afghāns style the people of the so-called Kāfiristān, which, like the term Kāfirī, is not a proper name, Spīn Kāfirīs and Tor Kāfirīs, and the Tāj*n*īks, or Persian-speaking people, style them respectively Safed-Posh or Safed-Poshān, and Sīāh-Posh or Sīāh-Poshān, meaning White-clad and Black-clad Unbelievers. I have entered fully into these matters in my 'Notes on Afghānistān,' and need not repeat them here.

I also notice in the May number of the 'Proceedings' (p. 311), that one of your correspondents refers to me in a notice of "Bolor or Bilaur," and appears to have had a peep into the Third Section of my 'Notes,' but which portion has not yet been published. I must mention, however, that Bilaur is not "precisely where Major Biddulph has run the fugitive name to earth," but a considerable distance from it. Your correspondent might have added that I have investigated *all* the authorities he alludes to, not "most" of them, for they are all contained, and mentioned by name, in that portion of 'Notes.'

H. G. Raverty, Major.

15th June, 1881.

REPORT OF THE EVENING MEETINGS, SESSION 1880–81.

Fourteenth Meeting, *27th June*, 1881.—The Right Hon. Lord Aberdare, President, in the Chair.

Presentation.—*Thomas Greer, Esq.*, M.P.

Elections.—*Major J. J. N. Buchanan; Henry Cookson, Esq.; Major C. Reginald Macgregor; Henry Mackenzie, Esq.; Henry Nottidge Moseley, Esq.*, F.R.S.; *Richard Charles Hungerford Phelips, Esq.; Guillermo Andres Wilson, Esq.; William Wood, Esq.*

The paper of the evening was—

"The Country of the Tekke Turcomans and the Tejend and Murghab Rivers." By Lieut.-Colonel C. E. Stewart, Bengal Staff-Corps. (Will be published, with the author's map, in a subsequent number of the 'Proceedings.')

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—June 17th, 1881: M. Daubrée, of the Institute, in the Chair.—M. Victor Guérin presented to the Society a large map of Palestine, which he has just published with the aid of the Bibliographical Society. This map, which is printed in three colours, is about 4 feet by 3 feet, and includes the names of some 1900 places, all of which the author has visited in several successive journeys, and which he has minutely described in a work in seven volumes, entitled 'Description Géographique, Historique et Archéologique de la Palestine.' This work is divided into three parts—Judæa, Samaria, and Galilee—each illustrated by a map; and these three maps M. Guérin has embodied in his large map of Palestine (scale 1 : 450,000).—M. Guérin afterwards delivered an address on the subject of the Regency of Tunis, of which he visited all the towns, villages, and tribes in 1860. On his return to France in 1861 he published (Paris: Plon), under the auspices and at the expense of the Duc de Luynes, a work in two volumes, entitled 'Voyage Archéologique dans la Régence de Tunis,' which was accompanied by a very detailed map of the country. As, since his exploration of Tunis, no European has so thoroughly examined it in every respect as he had himself done, and as besides nothing has changed in this country for the last twenty years, and the existing condition of affairs has attracted the attention of Europe to this interesting part of Africa, M. Guérin gave the meeting a rapid *résumé* of this work of his, which contains abundance of information, equally correct at the present day as at the time when his book was written. Time, however, did not permit him to describe his exploration of Zaghwan, Jugar, and Kairwan, the holy city of Tunis, which he was able to visit, though it is usually closed against Christians.

——— July 1st, 1881: Colonel PERRIER, of the Institute, President of the Central Commission, in the Chair.—There was an unusually large attendance at the meeting, as it was known that M. Ferdinand de Lesseps would address the Society for the first time since his nomination to the office of President.—On rising, M. de Lesseps first thanked the Society for the honour done him in electing him to succeed the eminent Admiral de La Roncière-le Noury, who had rendered such great services not only to the Society, but also to the Suez and Panama enterprises. M. de Lesseps promised to bring the same zeal and devotion to the performance of the duties of his post—a task in which he would be materially aided by the assistance of their learned and genial Secretary-General, M. Maunoir, and his colleagues of the Central Commission. Approaching the African question, which at the present time attracts so much attention, M. de Lesseps furnished some particulars respecting Major Roudaire's project of admitting the waters of the Mediterranean at the Gulf of Gabes into the inland depressions of Tunis and Algeria, its chances of success, &c. Passing then to West Africa, he pointed out how successfully M. de Brazza was accomplishing his difficult and noble mission in the basins of the Ogowé and the Congo, in the course of which he has already founded two stations for the French Committee of the International African Association. These two stations, the one on the Passa affluent of the Ogowé, and the other on the Congo, near Stanley Pool, are 180 miles apart, and the intervening region is healthy, fertile, and inhabited by a peaceable population. M. de Brazza would soon be able to make use of the steam-launches which have been taken out to him in sections by his colleague, Dr. Ballay, to place them on the Alima, that valuable connecting link between the Ogowé and the central and upper basins of the Congo, and thus to divert their commerce to the manifest profit of the French establishments on the Gaboon. In concluding his observations, M. de Lesseps said that mere applause was not sufficient, but that, as French explorers bravely and liberally devoted their lives to their work, so it was the duty of the public at home to furnish them with the necessary means for accomplishing an essential work of civilisation, which promised magnificent economic results.—On the motion of M. de Quatrefages, his proposition at a previous meeting that the Congo station should be called Brazzaville was formally put to the vote, and enthusiastically adopted.—A hearty welcome was afterwards given to Captain Gallieni and the members of his expedition, as well as to General Brière de l'Isle, late Governor of Senegal, who was in office when this expedition was despatched to open a trade-route from the Senegal to the Niger. The Chairman (Colonel Perrier) congratulated them on the success of their enterprise, and it was announced that a meeting would shortly be held at the Sorbonne in honour of the expedition.—Colonel Perrier then apologised for his recent absence from the meetings of the Society, during which he had had to organise the topographical service in Tunis, and prepare a map of the country of the Kroumirs, which will shortly be published. He announced that General Farre, Minister of War, had just granted members of the Society a reduction of 50 per cent. on the price of the maps published by the Dépôt de la Guerre, a concession which was evidently much appreciated by those present at the meeting.—The President reminded his audience that the fourth Session of the Congress of French Geographical Societies would take place at Lyons from September 5th to 10th, and that it would be followed by the International Geographical Congress to be opened at Venice on September 15th. Some information was afterwards given on various subjects connected with the latter Congress, and it was stated that the railway companies of Upper Italy would give a discount of 50 per cent. on their lines to those who went to Venice to attend it.—Major Titre, formerly chief of the Topographical Bureau of Algiers, next presented his map of Algeria on the scale of 1 : 800,000, for which he has laid under contribution all known documents both in France and Algeria.—M. Pastré then gave a brief account of his recent journey to Timbo in the Futa-Jallon highlands of Western Africa.—The most attractive feature, however, in the programme for the evening was a paper by M. Désiré Charnay on his archæological expedition in Mexico. Commencing with Tula, near Mexico, as their point of departure, M. Charnay followed the Toltecs, through all their migrations, to Yucatan, and he showed them to be a learned, lettered, philosophic, and artistic people, as well as great and remarkable builders, for they employed all kinds of materials for their houses, palaces, temples, &c. The monuments which M. Charnay discovered in the interior are identical with those which the Spaniards met with on the coast and considered to be of very great antiquity. M. Charnay, on the other hand, entertains a very different opinion, and believes that they all have a common Toltec origin, none of them being older than the twelfth century. M. Charnay's expedition was undertaken, to a great extent, at the expense of Mr. Lorillard, an American gentleman, to whom as well as to the explorer, a cordial vote of thanks was passed.

——— July 15th, 1881: M. DAUBRÉE, of the Institute, in the Chair.—The General Secretary read a letter from M. Ch. Rabot, who is now travelling in Norway. M. Rabot says that the last two polar winters, though very rigorous, have not had any great influence on the opening or closing of the passages, because the summers have been remarkably warm. This year, on the other hand, navigation will be stopped very early, as the summer is reported to be a very cold one in the extreme north. M. Broek, formerly a minister of the Norwegian Government, thought there was confirmation of his expectations in the fact that vast numbers of birds, driven out by the rigour of the climate, are now alighting on the shores of Norway. They are arriving in such a state of starvation, that they swallow the bait whilst the fishermen are casting their lines.—M. Cheysson, of the Ministry of Agriculture and Commerce, gave some particulars respecting the new map of France on the scale of 1:200,000, published by the Ministry of Public Works. This map will consist of 141 sheets, printed in three colours, and engraved on copper by M. Huellé. It is based on the Staff map on the scale of 1: 60,000, and includes the results of the most recent work of the Staff and other Government surveyors. Another edition is also to be issued on a larger scale, in which each sheet will represent a department.—M. G. Gravier gave a biographical sketch of the late Karl Weyprecht, the discoverer of Franz-Josef Land, and paid a just tribute of respect to this gallant Austrian officer and *savant*, by whose efforts the creation of circumpolar observatories has been assured.

Geographical Society of Bordeaux.—June 8th, 1881: Dr. Azam, President, in the Chair.—Captain Gallieni, who with his colleagues had been previously entertained at a banquet by the Geographical Society, delivered an address on the subject of his recent expedition from the Senegal to the Niger. In addition to their leader, the party consisted of four officers, M. Pietri, captain of marine artillery, M. Vallière, lieutenant in the same corps, and Dr. Bayol and Dr. Touttain, both naval surgeons. The expedition was a considerable one for an entirely unknown country, and including the native employés numbered about 150 persons. To each of the officers was assigned a particular duty:—Captain Pietri had charge of instruments of precision, Lieutenant Vallière of the topographical surveys, and MM. Bayol and Touttain of the ethnological and meteorological observations. The object of the expedition was to explore the country between Bafulabé and the Upper Niger, of which hardly anything was known except the watercourses, and but very little about them. It was considered advisable, too, to find out the best road from the French establishments on the Senegal to the Upper Niger, and it was necessary besides to enter into relations with the chiefs of the country, and especially with Ahmadu, the Sultan of Segou-Sikoro. On March 29th of last year the explorers reached Medina, on the Upper Senegal, and eight days later Bafulabé, beyond which Lieutenant Mage had been unable to penetrate in consequence of the opposition of Ahmadu. They continued their route by the valley of the Bakhoy, which they desired to explore, and this is almost the identical road which was followed by Mungo Park in 1805. Captain Gallieni afterwards described in some detail the proceedings of the expedition on their journey to the Niger, including the attack made upon them by the Bambarras, near Bamaku,* but as it has been announced that he will be publicly received at the Sorbonne by the Geographical Society of Paris, we reserve for that occasion our report of the results of his labours.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Baedeker, K.—London and its environs, including excursions to Brighton, the Isle of Wight, etc. Handbook for Travellers. 3rd edn. Leipsic (Baedeker), London (Dulau): 1881, 12mo., pp. x., 364, and Index of streets and plans, pp. 45. Maps, plans. Price 4*s.* 6*d.*

Parola, Giuseppe.—Saggio di Climatologia e di Geografia Nosologica dell' Italia. Torino (Bocca): 1881, 8vo., pp. 816. (*Dulau:* price 10*s.*)

After a general description of the physical geography of Italy, and discussion of the different climatic factors, the physiological action of meteorological phenomena, and other effects of climate, and of the results of density or sparseness of population, &c., the author enters into the question of general distribution of diseases in the peninsula, with special etiological deductions.

AFRICA.

Bernard, F.—Quatre mois dans le Sahara. Journal d'un Voyage chez les Touareg, suivi d'un Aperçu sur la deuxième Mission du Colonel Flatters. Paris (Delagrave): 1881, 12mo., pp. 170, map, illustrations.

The author, a captain of artillery, accompanied the first expedition of the late Colonel Flatters, whose object was to roughly survey the desert country south of the French Algerian frontier, preparatory to the establishment of the proposed Trans-Saharan railroad. This expedition left Biskra early in February 1880, and travelled south by Tuggurt, Wargla, Aïn-el-Taïba, and Temassinin, and south-east by the well-wooded valley of the Irharharer (practically Bu-Derba's route of 1858), to the junction of the Tijoujelt valley on the south, not far west of Tajenout. At this point, the surplus waters of the Tijoujelt during the rainy season are emptied into a lake, called Menghough, not given on Duveyrier's map or mentioned in works on the Sahara.

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* See 'Proceedings,' vol. ii. p. 563.

This lake was, at the time of Captain Bernard's visit, about 1100 yards long and 110 yards broad, with creeks fringed by tamarisk and flowering plants on its southern side, its shore elsewhere being low and clayey. Its water was sweet, but slightly brackish at the western part, where the deposits brought down by the Tijoujelt form shallows, on which the saline ingredients of the water are concentrated by the action of the sun. A small island in it was frequented by snipe, herons, and other semi-aquatic birds; and many fish were observed in its waters, including *Clarias lazera*, Cuv. and Val., a Nile species found elsewhere in the Tuareg region by Duveyrier. After some difficulty, the bottom of the lake was reached and measured; soon after leaving the banks, the sides reached 13 to 16 feet, and towards the middle narrow transverse fissures 25 feet in depth were found. This latter circumstance, added to the fact of the temperature rapidly diminishing from the sides, and the assurance of the Tuaregs that the lake was never dry, though of varying size according to season, led the author to the conclusion that there is a permanent source of supply; otherwise it would probably be classed with the neighbouring temporary lakes (Saghen) found north of Tajenout, on Duveyrier's route from Ghadames to Rhat.

At this point the expedition was forced to retrace its steps. His narrative contains many points of interest, descriptive of the scenery and the people of the desert; and he gives fifteen illustrations from his own sketches, representing important physical features, &c., of the country observed. His map (scale 1 : 5,000,000, the same as that of the French military map) includes North Africa from Murzuk to Agadir, and from the Mediterranean to the Oasis of Bilma (about 20° N. lat.). A slight vocabulary of Arab and Berber words is added, with the native names and identified descriptions of seventeen vegetables observed.

An account of the ill-starred second expedition, which the author did not accompany, completes the work.

Colonel Gordon in Central Africa, 1874–1879, with a portrait; and map of the country prepared under Colonel Gordon's supervision. From original Letters and documents. Edited by George Birkbeck Hill, D.C.L. London (De la Rue & Co.): 1881, 8vo., pp. 456. Price 1*l.* 1*s.*

Geographically, this curious volume is of scanty importance, except as containing scattered descriptions of slight topographical details, and of the political and economic conditions and relations of the Egyptian province of the Equator. But it is so far valuable as bearing the most convincing internal evidence that every word of it is written with the strictest good faith and closest adherence to fact. This point is so certain, and Colonel Gordon's quoted letters are so marked by an attractive combination of common sense and peculiar humour, that it is impossible to avoid the expression of regret that more is not published of the mass of available material, and that the writer of the letters has not himself edited them for publication. Dr. Hill has done his work well under the peculiar circumstances of the case; but he acknowledges an entire repudiation by Colonel Gordon of himself and his labours.

Some strictures (p. 90) upon the recognition of merit by the Royal Geographical Society seem the more illogical, as they are based upon an assumed looseness of remarks and non-observance of important things on the part of the writer, which is not only at variance with his evident accuracy of observation and intuitive quickness of appreciation, but strangely contradicted by his admission (p. 154) of grief at not having surveyed the gaps in the Victoria Nile, and by his account (p. 179) of his personal troubles in mapping a portion of the river. These and many other notes in the book (such, for instance, as the graphic sentences on p. 167 describing the peculiarly acrid and aciculate natural productions of Kerri, between Lardo and the Albert Lake, and the expressed envy of Schweinfurth's love of botany) sufficiently indicate that it was more the pressure of severe military and political responsibility than a want of aptitude or willingness that prevented Colonel Gordon from adding as he might have done to our geographical knowledge of the interesting country over which he ruled with such soundness of judgment.

The landing places given at p. 191, and the tables of distances and camel-routes, with altitudes (calculated by Captain Watson from observations by Colonel Gordon and himself) may be here noted; as may the portion of the work referring to the original exploration of the Albert Lake and the settlement of the question as to its connection with the system of the Victoria.

Meyer's Reisebücher.—Der Orient. Hauptrouten durch Ägypten, Palästina, Syrien, Türkei, Griechenland. Erster Band; Ägypten. Leipzig (H. J. Meyer, bibliographisches Institut): 1881, 12mo, pp. 316, plans, woodcuts. (*Trübner.*)

Contains a general map of the Levant (scale 1 : 10,000,000), maps of Egypt (scale 1 : 12,000,000), the Ionian Isles (scale 1 : 400,000), the Nile Delta and Suez Canal (scale 1 : 1,500,000), environs of Cairo (scale 1 : 200,000), the Nile from Cairo to Assuân (scale 1 : 1,500,000), and plans of Cairo (in cover, scale 1 : 18,000), Trieste, Venice, and Alexandria (scale 1 : 31,000), with transparent overlay of ancient Alexandria. These are all in colour and executed with great clearness. A map of Corfu also is given, with other woodcuts. The volume is chiefly remarkable for the amount of information and illustration comprised in a very small space, the mechanical compression scarcely interfering with the legibility of the type.

Tissot, Charles.—Le Bassin du Bagrada et la Voie Romaine de Carthage à Hippone par Bulla Regia. Paris (Imprimerie Nationale): 1881, 4to., pp. 116, maps, pls. (*Williams & Norgate:* price 10*s.* 6*d.*)

Extracted from the "Mémoires présentés par divers Savants à l'Académie des Inscriptions et Belles-Lettres," this treatise, like its predecessor, "Maurétanie Tingitaine," is a combination of historical geography and archæology. It contains the results of its author's rapid explorations in the valley of the Mejerda (the Carthaginian Bagrada), along which the line is to run which is destined to unite Tunis with the Algerian railway system, and in course of construction of which the necessary engineering operations are destroying the last vestiges of many ancient cities. M. Tissot has succeeded in fixing certain positions hitherto unknown, and in preserving memorials of various monuments of which all traces would soon have been lost. He did not cross the Tunisian frontier into Algeria, but takes the opportunity of correcting an error of Mannert (originally owing to Ptolemy), who wrongly considers the south-western affluent of the Mejerda, called Oued Chabro and Oued Mellag (or Mellegue) in different parts of its course, to be the main stream. Both local tradition and history appear to corroborate modern maps, on which the western arm, or Hamise, which rises near Khamisa (the old Thibursicum Numidarum) is given as the upper Mejerda. The lower arm, nevertheless, has by far the more remote origin.

The course of the river from the Tunisian frontier to the coast is shown on three maps (scale 1 : 150,000), which give the ancient and modern names of the various localities identified. Another map (scale 1 : 100,000) gives the topography of the Mejerda basin from the Kessab to the Zerga; and there are plans of the ruins of Bulla Regia (Hammam Darradji) and Utica (Bou-Chateur), with coloured views of Simittu (Chemtou) and Trajan's bridge there, Bulla Regia, Tiberius's bridge, and Vespasian's camp between Picus and Vicus Augusti.

Winstanley, W.—A Visit to Abyssinia. An account of Travel in Modern Ethiopia. London (Hurst and Blackett): 1881, 2 vols. cr. 8vo., pp. 310 and 307. Price 21*s.*

The author (who gives no dates) practically follows De Cosson's route: landing at Suakin, he crosses the Nubian desert to Berber, then ascending the

Bahr-el-Azrek to Abu Haraz, near the junction with the Rahat. From this point he strikes south-east to Katarif, Galabat (or Metemna), and Serramba (Char Amba or Ambachara), visiting Lake Tzana and Debra Tabor, and returning to Galabat by the eastern shores of Tzana and through Dembea. His interviews with King Johannes, the personal incidents of travel, and descriptive account of the country traversed and its products, will be read with interest.

AMERICA.

Boyd, C. R.—Resources of South-West Virginia, showing the Mineral Deposits of Iron, Coal, Zinc, Copper, and Lead. Also the staples of the various Counties, Methods of Transportation, Access, &c. New York (Wiley): 1881, 8vo., pp. 321, map, plates. (*Trübner & Co.*)

This work discusses the general geography, geology, topography, products, and industrial features of nineteen counties in South-Western Virginia, with special attention to the mineral capabilities. The map (scale slightly exceeding 6 miles to the inch), in addition to the usual features, shows the different geological formations, with various cross-sections.

La Selve, Edgar.—Le Pays des Nègres. Voyage à Haiti, ancienne partie Française de Saint-Domingue. Paris (Hachette): 1881, 12mo, pp. 376, map, illustrations. (*Williams and Norgate:* price 3*s.* 6*d.*)

Chiefly of historical interest.

Olascoaga, Manuel J.—Estudio topográfico de la Pampa y Rio Negro. Comprende el Itinerario de todas las Columnas de operaciones que ocuparon el Desierto y llevaron la Línea de Frontera sobre dicho Rio, á órdenes del Exmo. Señor Ministro de Guerra y Marina, General D. Julio A. Roca. Buenos Aires (Ostwald & Martinez); 1880, fo., pp. 279, map, illustrations.

A descriptive account of the routes and operations of the force which carried the military frontier of the Argentine Republic to the Rio Negro in 1878–79.

The map (scale 1 : 2,000,000) includes the whole width of the Continent, from Montevideo to Valparaiso, and from San Luis in the north to the mouth of the Chubut, with an inset of the mouth and bar of the Rio Negro. The physical conditions of the country traversed by the different army corps are shown on it to a great extent, and a large number of Indian names of places are also given on it with their Spanish equivalents, as materially aiding in the acquisition of topographical knowledge. Some lithographic views of scenery accompany the work, which contains much scattered information on the hitherto little known region of the Argentine Pampas.

ARCTIC.

Meddelelser om Grønland, udgivne af Commissionen for Ledelsen af de geologiske og geographiske Undersøgelser i Grønland. Kjøbenhavn (C. A. Reitzel): 1881, 8vo, vol. ii. pp. 246, coloured maps and plates, tables, woodcuts; vol. iii. pp. xxxvi. and 231, coloured maps.

The continuation of the Memoirs on Greenland, published by the Danish Commission for conducting geological and geographical researches in that country, and of which vol. i. was noticed in our 'Proceedings' for 1880, p. 72.

Vol. ii. contains details of the expeditions in the Julianehaab district in South Greenland in 1876, by K. J. V. Steenstrup and A. Kornerup, with especial reference to geography; observations by Steenstrup on a well-executed and coloured geognostical map of part of the district; an examination by J. Lorenzen of the various mineral substances (including a new one named Steenstrupine) in its Sodalith-Syenite formation; astronomical observations by Steenstrup, G. Holm, and Lieut. J. A. D. Jensen in the Julianehaab and Frederickshaab districts; an account of the expeditions to the Holstenborg and Egedesminde districts in 1879, with geographical results by Jensen, and geological observations by Kornerup; astronomical and meteorological observations near Vandets Saltholdighed by Jensen; a report to the Danish Minister of the Interior of the explorations in 1878, 1879, and 1880; and part 2 of the general Summary (in French) by F. Johnstrup.

In addition to the map above mentioned, this volume is illustrated by a coloured map of the west coast of Greenland from Kangatsiak to Holstenborg, by Lieutenant Jensen, reaching inland to 49° 40′; and an accompanying geological map of the same district by Kornerup, with special reference to the inclination and direction of the stratified crystalline rocks (chiefly forms of gneiss) which here replace the eruptive series of the other districts examined. A coloured panoramic view from Mount Nagtoralinguak of the vicinity of Holstenborg is also given, representing the conspicuous parallel lines of cleavage on the north shore of Ulke Bay; this parallelism extends also invariably to the mountain ridges, showing in an astonishing manner the regularity of the cleavage over vast spaces, the elevations and depressions of the primitive surface of the gneiss being evidently due to its agency. Coloured views, showing the rock formations, are also given of the north side of Tunugdliarfik Fjord, Redekammen, and Nunasarnausak, and various points showing parallel cleavage; and plain views of the sandstone cliffs at Musartut, with their veins of porphyry, and of Mount Suikarsuak in Tasermiut Fjord. This mountain, with its strong-curved sides and deeply excavated centre, was examined with the idea of justifying Mr. Major's supposition as to its being the volcano mentioned by the brothers Zeno; but it is considered to be owing in greater part to an erosion posterior to their time. Some woodcuts of peculiar geological features, ruins, &c., are also given.

Among the points of interest recorded in this volume may be noted the observations on the progressive rates of motion of various glaciers; the new and rare mineral substances above referred to, with a marked preponderance of sodium as a base; the evidence afforded by the fossil *Mollusca* of the raised terraces of Narsak and Siorarsiut being specifically identical with now existing coast forms, that Greenland, like Scandinavia, was upheaved after the glacial epoch; and the details of the exploration of the uninhabited region between 66° 55′ and 68° 30′ N. lat., by Jensen in 1879. The interior of this district is visited annually by the Greenlanders for reindeer hunting, and evidence is given of the large number of these animals massacred (estimated by Rink as 16,000 per annum in South Greenland alone). The glacial waters of the Fjords of Nagsugtok and Isortok in this region were found to exhibit an enormous difference in the amount of earthy detritus per cubic metre conveyed; the former having only 200–235 grammes, whilst the latter contained from 9129 to 9744 grammes. Comparisons are made with other rivers, from which it appears that the Yang-tse-kiang contains about half this latter quantity, whilst the glacier-fed Aar only contains 142 grammes. The continental ice of Greenland moves much more quickly towards Isortok Fjord; and from an approximate measure of the mass of water poured into it, the solid contents are estimated at 4,062,000,000 kilogrammes (very nearly 4,000,000 tons) per day. This vast amount of sedimentary matter naturally chokes the upper part of the fjord and renders navigation impossible, even by flat-bottomed boats. When the sun dries it, its fine particles are set in motion by the slightest breeze, and the air is filled for a great distance with clouds of dust, covering rocks and plants with a greyish powder, and giving a depressing tone to the whole landscape.

Vol. iii. consists of a Conspectus of the Greenland Flora by Joh. Lange, with three maps: one of the North Greenland colonies, after Rink and Steenstrup; another of Holstenborg, Sukkertoppers, and Godthaab in the south, after Kleinschmidt's MS. map; the third of Frederikshaab and Julianehaab. 378 species of plants have as yet been discovered, whereof 170 only have been found on the west coast. A summary in French is given by the author, and a general sketch in that language of the physical conditions of Greenland is added by Kornerup, with special reference to its capabilities of producing vegetables useful for man. Cereals do not succeed, but the natural grass meadows of the southern fjords already support several cows. The most northern garden in the earth is at Umanak (71° N. lat.), where various culinary vegetables are grown successfully.

GENERAL.

[Congress of Commercial Geography.]—Comptes Rendus sténographiques publiés sous les Auspices du Comité Central des Congrès et Conférences et la direction de M. Ch. Thirion, Secrétaire du Comité, avec le concours des Bureaux des Congrès, et des Auteurs de Conférences. Congrès International de Géographie Commerciale, tenu à Paris, du 23 au 30 Septembre 1878. No. 28 de la Série. Paris (Imprimerie Nationale): 1881, 8vo., pp. 277.

This Report of the meetings of the International Congress of Commercial Geography at the Universal Exposition of 1878 at Paris, is one of a series of 32 published by the Minister of Agriculture and Commerce (M. Teisserenc de Bort), the Honorary President. It contains the account of the papers read and discussions thereon in the five Sections of the Congress, of which the 1st referred to Commercial Explorations and trade-routes; the 2nd and 5th (united) to Natural and manufactured products and general matters; the 3rd to Emigration and Colonisation; and the 4th to Instruction. The chief resolutions passed were as follows:—(Sect. 1) For the furtherance of the Interoceanic Canal through the American isthmus; for the establishment of an International Commission to protect the agents of commerce in the Niger basin; for the acceleration of the railroad to Touat; for the foundation of foreign and provincial Corresponding Committees, having in view the scientific and economic instruction of exploring colonists; and for calling attention to the opening of a trade-route to the southwest provinces of China through Tong-King, secured by treaty between France and Annam in 1874, of the execution of which it was desirable to urge the enforcement. (Sections 2 and 5) For the permanent establishment of a Congress of Commercial Geography, the establishment of an International Meridian, and various points requiring support by the respective Governments of the countries interested. (Sect. 3) For the establishment of Councils for emigrational purposes, founded by Geographical Societies, to whom reports should be furnished by the various Government agents; and for the promotion of African emigration. (Sect. 4) For the establishment of a Chair of Commercial Geography in the Paris Conservatoire; for the general furtherance of geographical instruction in schools; and for the foundation at Paris and other capitals of a School of Scientific Missions, under the Department of Public Instruction, in which proper practical teaching should be accessible to travellers.

Daniel, Hermann Adalbert.—Handbuch der Geographie. (5th edition.) Bd. I. Vollständig umgearbeitet von Prof. Dr. Otto Delitsch. Leipzig (Reisland): 1881, 8vo, pp. 1179. (*Dulau:* price 12s.)

This volume of the considerably augmented new edition of Daniel's standard educational work includes General Geography and the whole world excluding Europe. Vols. iii. and iv., in like manner worked up to date by D. T. Fischer, are also ready; they respectively refer to the physical and political geography of Germany. Vol. ii., by Dr. Delitsch, referring to Europe, excluding Germany, is in the press.

Zöller, Hugo.—Rund um die Erde. Niederländisch-Indien. Die Südsee. Australien. Hinter-Indien. Sitten- und Culturschilderungen aus den hervorragendsten Colonialländern nach ihrem heutigen Standpunkt. Köln (Du Mont-Schauberg): 1881, 2 vols. cr. 8vo., pp. 1–319 & 321–679. (*Williams & Norgate:* price 10s.)

The author was originally commissioned by the proprietors of the *Kölnische Zeitung* to visit the South Sea and Netherland Indies on the occasion of the Sydney and Melbourne Exhibitions, with special reference to collecting material bearing on German colonisation. The journey was extended over the years 1879 and 1880, and the results, now collected together, have from time to time appeared in the newspaper above named.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Fleischhauer, W.—Karte d. Landdrostei-Bez. Hildesheim. Scale 1 : 275,000 or 3·7 geographical miles to an inch. Kassel, Fischer, 1881. Price 6*d*. (*Dulau.*)

Ministre de l'Intérieur.—Carte de France dressée par le Service Vicinal. Paris. Scale 1 : 100,000 or 1·3 geographical mile to an inch. Sheets:—X. 11, XI. 21, XII. 10, 11, 17, XIII. 19, 20, 23, 24, 25, 26, XIV. 20, 23, 24, 25, XV. 23, 24, 25, XVI. 16, 25, XVII. 16, XVIII. 14, 15, XIX. 15, 31, XXI. 9, 10, 13, XXII. 10. Price of each sheet 7*d*. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Karte der St. Gotthard-Bahn in drei Blättern. Nach dem endgültigen Eisenbahn-Tracé und im Auftrag der St. Gotthard-Direction reduzirt auf Dufour's Karte der Schweiz. Gestochen im Topographischen Institut von Wurster, Randegger & Co., in Winterthur 1880. Scale 1 : 100,000 or 1·3 geographical mile to an inch. Petermann's 'Geographische Mittheilungen,' Ergänzungsheft No. 65. Taf. 1, 2, & 3. Justus Perthes, Gotha, 1881. (*Dulau.*)

Phiquepal d'Arusmont.—Atlas général du Gers, Carte du Canton de Miélan, dressée sous l'administration de M. Et. Joubert, préfet du Gers. Revue, corrigée et mise au jour par l'administration des ponts et chaussées du Gers, 1881. Paris, Livraison 14. (*Dulau.*)

Prussian Government.—Karte des Deutschen Reiches. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme 1881. Scale 1 : 100,000 or 1·3 geographical mile to an inch. Sheets:—5, 12, 20, 35, 37, 366, and Title Sheet. Price 1*s*. 6*d*. (*Dulau.*)

Reynard, J.—Carte topographique du département du Puy-de-Dôme, dressée à l'échelle de 1 : 160,000 or 2·1 geographical miles to an inch. Clermont-Ferrand, 1881. (*Dulau.*)

ORDNANCE SURVEY MAPS.

1-inch—General Maps:—

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6-inch—County Maps:—

England: Berks: Nos. 40 and 48; and Bucks: No. 58, on one, at 2*s*. Cheshire: Nos. 2 and 5, at 2*s*. Essex: Nos. 22 and 79, at 2*s*, Nos. 8, 11, 23, 33, 42, 46, 49, 55, 57, 58, and 68, at 2*s*. 6*d*.

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Hooghly Entrance Channels. By Mr. S. Reed, assisted by Messrs. Webster, Jones, Waller, Cox, and Le Patourel, of the River Survey Department, January and February 1881. Scale 6000 feet to 1 inch. (*Stanford, agent.*)

Petermann's 'Geographische Mittheilungen.'—Graf Szechenyi's Reiseroute von Sayang bis Bamo. Aufgenommen und gezeichnet von Oberlieutenant Gustav Kreitner. Scale 1:1,000,000 or 13·6 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 12. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Andriveau-Goujon, E.—Carte générale d'Afrique d'après les dernières découvertes. E. Andriveau-Goujon. Paris, 1881. Price 3*s.* (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Skizze von Dr. W. Junker's Reisen, Juni bis December 1880. Scale 1:4,000,000 or 55·5 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Seite 252. Justus Perthes, Gotha. (*Dulau.*)

AMERICA.

Gavarette, J.—Carta de la America central, publicada por Machado, Yrigoyen y Cª. Paris, 1881. (*Dulau.*)

——— Carta de la república de Guatemala en la America central, publicada por Machado, Yrigoyen y Cª. Paris, 1881. (*Dulau.*)

Moreno, F. P.—Esquisse de la Patagonia (République Argentine), Itineraire 1873-1880. Paris, 1881. (*Dulau.*)

Vuillemin, A.—Carte de l'ile d'Haïti pour l'enseignement de la jeunesse haïtienne. Paris, 1881. (*Dulau.*)

CHARTS.

U.S. Hydrographic Office.—Chart No. 225. South-west Coast of Alaska. Alexander Archipelago. From the British Admiralty Chart, Cordova Bay to Cross Sound, published in 1865; corrected from reconnaissances by the officers of the U. S. Ship *Saginaw*, Comdr. R. W. Meade, in 1869, and U. S. Ship *Jamestown*, Comdrs. L. A. Beardslee and H. Glass, in 1880. Hydrographic Office, Washington D.C.; corrected to 1880. Price 1*s.* 8*d.*

GLOBES AND EDUCATIONAL.

Chavanne, Dr. Josef.—Physikalische Wandkarte von Asien entworfen und gezeichnet von Dr. Josef Chavanne ausgeführt in Eduard Hölzel's geographischem Institut. Scale 1 : 8,000,000 or 109·5 geographical miles to an inch. Ed. Hölzel, Vienna, 1881. 6 sheets. Price 16*s.* (*Dulau.*)

This is a companion map to the 'Physikalische Wandkarte von Afrika,' by the same author, published in 1878, being drawn in the same style and on the same scale:—1 : 8,000,000. The heights from sea-level to, and above, 20,000 feet are shown by five different shades of drab; the valleys and depressions below sea-level are distinguished by two shades of green, while the ocean depths under and above 50 fathoms are coloured light- and dark-blue respectively. There are two inset maps given, on a scale of 1 : 50,000,000, one showing the distribution of the human races in Asia, and the other its political divisions. This map, like its companion map of Africa, seems to be particularly suited to the purposes of instruction.

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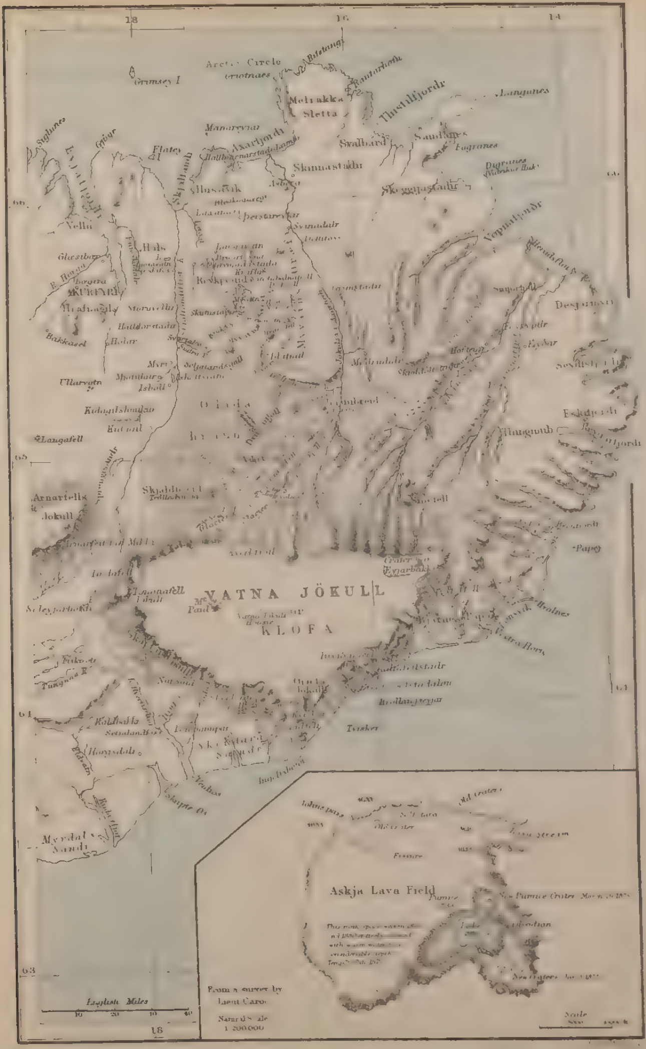
EAST COAST OF ICELAND

to illustrate the paper by Mr W G Lock.



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PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

The Country of the Tekke Turkomans, and the Tejend and Murghab Rivers.

By Lieutenant-Colonel C. E. Stewart, 5th Punjab Infantry.

(Read at the Evening Meeting, June 27th, 1881.)

Map, p. 576.*

I.

In April 1880 I left Constantinople for Persia, travelling by Trebizond, and through Armenia. At the time I passed through Armenia the famine in the land was terrible. When I approached a village, the first sight I saw was the whole of the women and children out in the fields collecting crocus bulbs, dandelions, and grass, to eat. I was glad to get away from a place where it was so dreadful to see suffering which one was unable to alleviate. There was no food for the people, and small gifts of money, which was all I was able to bestow, were nearly useless. I went from Erzerum by Bayazid to Khoi in Persia, visiting many of the battle-fields of the late war between Russia and Turkey *en route*, and passing over some of the Kurd country whence Shaik Obidullah later drew a portion of the troops with which he invaded Persia. I travelled from Khoi past the Lake of Urumiah to Tabriz and Teheran, and from Teheran to Ispahan. At Ispahan I remained for two months and a half, residing in the Armenian suburb of Julfa. I had determined to visit Daragez, and here I made my preparations.

Daragez is a district of the Persian province of Khorasan. It is situated across the mountain range which elsewhere forms the boundary of North-Eastern Persia. As Daragez projects into the Tekke Turkoman country it is a good place from which to gain information of that tribe. The best road from the country of the Akhal Tekke to the country of the Merv Tekke passes through the district. I knew that if I travelled as an Englishman, as Colonel Baker and Captain Gill had done, I should not be able to collect information, as I should be watched and have a guard with me, who, as the Persians would say, were furnished to do me honour and protect me, but who, I knew, would have positive orders to prevent my holding free and independent communication with the Turkomans in Daragez, and that if I was permitted to have any intercourse with Turkomans it would only be with such as would tell me what the Persian governor wished I should be told.

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* A large portion of this map is laid down from surveys made by Lieutenant-Colonel Stewart himself, much of it having not been previously surveyed. The parts of Khorasan unvisited by him are taken from the map of that province by Major the Hon. G. Napier, and the parts in the new Trans-Caspian province of Russia, from the Russian map of 1881. The country on the Tejend and Murghab rivers is laid down from information carefully collected from the Turkomans by Lieutenant-Colonel Stewart. For the portion of Afghanistan which appears, the map of Major-General Walker has been consulted.

I had on one of my previous visits to Persia been at Julfa, and I knew it to be a good place at which to make preparations for my journey. I here hired two Armenians to accompany me on my travels, one as a sort of partner and clerk, the other as a servant. I determined to travel as an Armenian horsedealer of Calcutta. I had been in Baghdad and Mesopotamia, and knew the ways of the Bombay horsedealers who visit those places. This knowledge now stood me in good stead. As the price of horses has risen very high in Baghdad some of these men visit Persia, and travel as far as Mash-had on horsedealing expeditions; and I found one party had actually been to Mahomadabad in Daragez before me, which of course smoothed matters for me. I procured two suits of Armenian clothes, and a black lambskin hat. I left Ispahan on the 30th of September, dressed as an Englishman, ostensibly to travel in Western Persia, but after marching in that direction about one march and a half, I turned round and steered by compass for Nain, leaving all roads. I had not even told my partner and servant exactly where I was going, as I thought the best way for me to keep the secret was not to let them know. When I came to a desert place I changed my clothes, and threw my hat, which could not be hidden, down a karez or underground canal. I had chosen the character of an Armenian horsedealer from Calcutta because I thought I could sustain that rôle better than any other. I had travelled much in Asiatic Turkey and in Persia, and knew Oriental ways. The Armenians of Calcutta have chiefly come from Julfa in Persia, and it was one of these Armenians that I determined to personate. I dressed just as a well-to-do Armenian would have done. My partner and servant were Armenians who had visited India, and could speak Hindustani. We ordinarily spoke Persian, but if I wanted to say anything private I spoke to them in Hindustani; the bystanders then imagined we were speaking Armenian. If by chance any one who had visited India understood what was passing, which was very unlikely, there would be nothing curious in an Armenian horsedealer from India speaking the language of that country. Any peculiarity in my accent when speaking Persian would be put down to my having learnt it in India. My only fear was that I might chance to meet real Armenian traders, but I knew they seldom visit Daragez, as they are too much afraid of being carried away and sold as slaves by the Turkomans.

The first town I reached was Nain, celebrated for its faience in ancient times, and even now the pottery made in this town is the best manufactured in Persia. I did not enter the town, as I did not yet feel confidence enough in my new dress to face the Persian officials who would probably have interviewed me. I heard that the road from Nain to Tabbas across the Kavir or Great Salt Desert was very difficult, in consequence of the want of water, and that the road, though difficult, was better by Ardakan. I therefore went to Ardakan, which is a place of some 20,000 inhabitants, situated not far from the Kavir or Great Persian Salt Desert. A road leads from Ardakan across the desert, which is used by pilgrims from Southern Persia to the Holy Shrine of Imam Reza at Mash-had. At this season the pilgrim caravans are not very numerous, as the heat in the desert is still very great, and this is the time when there is least water. Rain rarely falls in Southern Persia except in the winter months, and no rain had fallen in this part of the country for six months, so the *hoaz* or reservoirs for water on the road were generally empty, and water only remained at places where there were natural springs, which were rare and far apart.

Ardakan is surrounded by high walls of the most flimsy description. They look exactly as if they were made of the sort of gingerbread known as "parliament," and they were cut into a serrated pattern at the top, which still further increased their resemblance to gingerbread. These walls are, however, only meant to resist an attack of people unprovided with artillery, so they are sufficient. Ardakan carries on a good trade with India, and many of the people have visited that country in the course of business. I stayed at the caravanserai in this town, and was not recognised in any way. Within a few miles of Ardakan, the desert country commences, and in every direction there is nothing but barren, stony hills, and equally barren plains. Many of these hills are of a peculiar colour. They are generally composed of a hardened clay, and have a curious red appearance, being stained with ferruginous oxide. The explanation of this peculiar colour, I believe to be that each grain of clay of which the mountains are composed is coated with a very thin pellicle of peroxide of iron.

The first march from Ardakan was to a village called Homin, 30 miles over a very desert country. Homin was a pretty little oasis in the desert, watered by a tiny spring. Wherever water can be found, every sort of fruit flourishes; pears, apricots, apples, and walnuts abounded in this place. A very fine variety of ibex is plentiful near Homin.

I procured some of the horns, and hope to get the species identified. It is not the ibex of the Himalayas, *Capra sibirica*, the horns being very different. It is, however, similar to a living specimen which I procured in the Sulimani range of mountains on the north-west frontier of India. The wild sheep (*Ovis cycloceros*) is very plentiful, and the Ahu antelope is also found. Homin would be a paradise for a sportsman. It is a cool place even in summer, having an elevation of 6000 feet. It is curious that the other large goat—the markhor (*Capra megaceros*) which is common in the Sulimani Mountains of Afghanistan, is not found here.

I marched from Homin on the 15th of October. The road leads up a great ravine for many miles. I possessed only the three horses we rode, and carried the few things I required in a large pair of saddle bags on my servant's horse. One of my animals got a bad sore back, which delayed me very much. I could not purchase a horse to replace him, and was obliged to hire two donkeys, and though Persian donkeys are wonderful beasts, carrying heavy loads, they delayed me a good deal. I travelled without a guide, and the only water being a short distance off the road in a side ravine, I missed it in the night. As soon as I found I must have passed the water, I went a few hundred yards off the road, and went to sleep in the stony bed of the ravine, after picketing the horses and giving them some food I always carried for them. At dawn, I went back, and found the water, and also the donkeys, who with their driver had lost their way in the night, and only reached the water at the same time that we did.

The road from Yazd to Tabbas joins the road from Ardakan to that place in the ravine just mentioned, a few miles before reaching Doh Kulli, as this small spring of water is called. After watering our horses at the spring, we went on across the same barren country. At 29 miles from Homin we reached a caravanserai in the desert named Rizab, where there was a very small spring of brackish water. Near this place was a deserted village, which had been destroyed many years before by Biluchi marauders from Seistan. This is the furthest point to which I have heard of Biluchi raids extending, and considering the great distance from Seistan it is wonderful that their raids should extend so far.

The following day we marched 13 miles to the village of Sukand, or Sagand, as it is more usually called. This place is said to derive its name, which means sweet water, from the fact that the water is here really sweet, which is very rare in this part of the country, the water in most places being brackish. Sukand is a poor village, situated in a fort, but has a fine brick caravanserai. The people live by grazing flocks of fat-tailed sheep on the sparse vegetation of the less barren parts of the desert.

The fat-tailed sheep is eminently fitted for living in a desert land.

Firstly, it does not require grass, and can live and thrive on sage-bush, and tamarisk scrub, and the few aromatic shrubs which grow here and there in patches in the more fertile spots on the edge of the desert. During the spring and early summer the tail gets very fat; the substance contained in it being something between marrow and fat. During the winter, when snow often covers the ground and there is hardly any grazing, these sheep pick up a very precarious living, the shrubs that they usually subsist on having dried up and partially withered away, but they are able to support themselves on wonderfully little food, the fat of the tail being absorbed into the system and acting as food. The same is also the case with camels; when well fed their humps get enormously fat, and the layers of fat in this part of their bodies act as a reserve of food, being absorbed in their desert journeys. I once examined a really fat camel's hump in a camel-butcher's shop in Baghdad, and the layers of fat were most singular in appearance.

I found the small population of Sukand much excited at the news of the arrival of a large party of raiding Biluchis, who were said to be stopping and plundering caravans between this place and Tabbas. I could get no guide to accompany me, and could hire no donkeys. At last, after great difficulty and on my pointing out that as yet the news was that the Biluchis were on the other side of Pusht-i-Badan, I got a man to go with me as far as the next village, 38 miles off.

I started in the afternoon: the barrenness of the land got worse and worse, the whole country between Sukand and Tabbas can only be described as a terrible desert. At the end of 14 miles there is a fine caravanserai and a ruined village called Illahabad, which had been plundered and burnt by Biluchis twenty-five years ago. Near the village there is a little tamarisk scrub, and the eye is delighted with the sight of the green. There is a well of water at Illahabad, but it is very deep and the water very brackish when obtained, so it is never used by travellers. Sometimes camels and sheep are brought here to graze, but at present they have all been driven away to places where there are forts, for fear of the Biluchis.

Soon after passing Illahabad a small piece of *kavir* or salt desert is passed. Although the whole country I am travelling over is known as kavir, that is a misnomer. It is certainly a desert, and some portion is probably surpassed in desolation by no desert tract in the world, but only portions of it are true kavir or salt desert. This occurs in patches. Some of these, however, are very large, extending to more than 100 miles in length, and 25 to 30 miles in width. The larger tracts of kavir are all to the northward. In the southern part of the desert the rainfall is so small that the patches of kavir are much less in extent. The kavir I am now crossing, though not of great extent, may be taken as a type of a salt desert. I will describe one, and point out what I think is the cause of this curious formation.

I believe the whole of the country I am now travelling over was once the bed of a shallow sea. It has every appearance of having been the bed of such a sea. Persians have traditions that it was so, and though of course these traditions are mixed up with incredible fables, still they point to a probable fact. One account says Iran was formerly covered with water, and that King Solomon, by the aid of two Deevs, or demons, named Ard and Bil, drained off the waters into the Caspian Sea, and that the town of Ardabil in Northern Persia takes its name from these demons who helped King Solomon. Another tradition refers to the kavir alone, which it says was drained on the day Mahomad was born, by a miracle. The mountains bear all the characteristics of strata formed in the bed of a shallow sea or lake. The red colour caused by oxide of iron, and which I mentioned before, is, I believe, a sign of strata so formed.

When the uprising occurred which drained the sea, this desert still remained considerably below the level of the neighbouring Persian highlands, and the rivers continued to drain into it and formed marshes. The waters of all springs and rivers contain salts in minute quantities, but the rivers of Persia are often so salt as to be undrinkable. The salts brought down by the rivers are deposited in the marsh, which thus gets salter year by year. It dries up during the fierce summer heats, to become a marsh again when the winter floods occur. This process is repeated for ages, and in the course of time the whole soil over which the marsh extends becomes encrusted with salt.

When springs are present on a portion of kavir I have seen the salt extracted in the following manner. The water is made to pass over a considerable piece of kavir until it becomes very strongly impregnated with salt; it is then run down into a shallow basin and allowed to evaporate, leaving a cake of salt nearly a foot thick. In some places cakes of this thickness are lying on the surface without any aid from man, but this is rare. When a comparatively large river forms the marsh the extent of country affected is great, the area of salt marsh depending upon the volume of water brought down.

There are various sorts of kavir, depending upon the soil and the amount of salt. One sort is in ridges, looking as if the ground had been ploughed up, then left fallow for some time, and a glazy coating of salt clay afterwards poured all over it. When this glazy coating is trodden upon it gives way, and the horses' hoof sinks into a powdery sort of soil containing much salt. If this sort of kavir is ridden over, a continued crackling sound is heard, caused by the horses' feet breaking through the glazy surface. At other times the whole surface seems rotten, and the horses' feet sink deeply into it, causing salt to show white on the surface. Sometimes a damp spot is come upon, looking as if it had sweated up from below.

When a tract of salt desert is crossed on a bright moonlight night it has a strange appearance. Persians, who are very superstitious, declare that djins and demons live in these salt deserts, and tell innumerable stories of their appearing to human beings, and of the scurvy tricks they play them. Such a place is well fitted for ghost stories. A strange weird feeling is apt to steal over one, and to beget thoughts of some fabled dragon of old, the crackling soil representing his wrinkled skin, and the damp places seeming to be wetted by his loathsome sweat. Persians firmly believe in demons. A man whom I once sent with a letter to order post-horses did not arrive at the town to which he was commissioned to go, but returned to the place from which he was despatched. On being interrogated as to his return, he declared he had seen two demons on the road, who barred his way and only disappeared at daylight, when they vanished in the form of wreaths of smoke. A friend of mine suggested that the vision may have been due to spirits of another sort.

After a long desert march of 38 miles without water we reached the miserable village of Pusht-i-Badan. The houses were nearly all in ruins, and the whole place had a most desolate look which was very depressing. Our horses had heavy saddle-bags to carry besides ourselves, and the pony I was riding fell from sheer fatigue, just before reaching the village, though I had rested several hours, and fed him twice on the journey.

At Pusht-i-Badan there are two springs of water, one brackish and the other fresh. From these springs, about a square mile of ground is watered and cultivated, but the place does not supply food enough for its inhabitants and the pilgrims who pass through it on their way to Mash-had. I here found the alarm about the Biluchi band, who were plundering, even greater than at Sukand. I was not aware that Biluchis were so much dreaded by the Persians as they appear to be, though I knew that a Turkoman would scare a multitude of Persians from the southern provinces of the kingdom. After much difficulty I persuaded a man to accompany me as guide to the next stage.

We left Pusht-i-Badan in the afternoon, and after 4½ miles of the usual bare plain, reached a poor little hamlet called Shorab, or salt water, where there is a spring of brackish water and a little tamarisk scrub. It is very curious that this spring contained many fish; all these small springs in Persia do contain fish, which take refuge in the karez or underground channels that convey the water from its source to the surface. Many of the fish which inhabit these channels are blind, living as they do in the dark channels which often run for 30 or 40 miles before they are brought to the surface; from disuse of their eyes they lose their sight.

After passing Shorab, the same desert country is passed over until a low ridge of hills is reached, where there is a fine reservoir for water protected by a tower called Haoz-i-Shah Abbas, but at this season the tank is dry. It is 18 miles from Pusht-i-Badan. This low ridge is the dividing line between Khorasan, the ancient Parthia, and Yazd. After passing Haoz-i-Shah Abbas the desert becomes worse than ever; heretofore it has consisted of solid earth, but here we reach sand-dunes, and the road leads up one and down another, the one so like the other that it is difficult to keep on the right track. It was a lovely moonlight night, and I and my partner pressed on, leaving the guide and donkeys behind. Our progress was very slow indeed, as the horses sank at every step to their fetlocks, and sometimes to their knees in the loose sand. We were afraid of loosing the road. At last, after six miles of sand, we got to a low ridge of hills, which was a great relief to our tired horses, as they had firm ground to walk over. At the end of this ridge, where the road descends again to the plain, there was a small spring of sweet water known as Chasma Shutaran or the camels' spring. Here there was a deserted tower. I had been specially warned against resting here, as it is the haunt of Biluchis when raiding.

I filled my large leathern water-bottle, which held about a gallon; watered the horses, and went on. As it was still some miles to Robat-i-Khan, and my horses were very tired, although I had already rested them once, I proceeded about half a mile, then turned off the road and found a splendid hiding-place in a ravine, where we could see without being seen. Here I rested for about two hours, until the man with the donkeys came up. He was in a great state of fear, declaring the Biluchis were about. After the animals had rested, we went on through a rather sandy tract of country to Robat-i-Khan, distant 39 miles from our starting-point. Robat-i-Khan is a small village, strongly fortified with a high tower outside it, and a large caravanserai. There is a spring of brackish water which fills a tank. Some little distance off there is a fine *haoz* or reservoir containing sweet water.

A great many pilgrims were collected in the caravanserai at this place in consequence of the petty official of the Khan of Tabbas, who was stationed here with a few mounted men to guard the frontier of Khorasan, declaring that he had orders to prevent any one going on, as a band of marauding Biluchis had possession of the road a few miles from Robat-i-Khan. I could get no guide and no donkeys to carry the saddle-bags of my horse, which was laid up with a sore back. I had to wait three days here, the people of the place being in great terror, as they declared, of an attack by Biluchis.

I here for the first time saw two men, who with their wives had been carried off and plundered by Biluchis. They said that they and their wives, with two other men, were on the road from Kirman to Tabbas, and when 80 miles to the southward of this place they were pounced upon by a band of thirty-seven men, most of them mounted on the swift Seistan camels so celebrated for their speed. They and their wives were stripped of everything but the most necessary clothing, and were carried about on camels for three days. One of their party who knew the country gave offence to the Biluchis by refusing to act as guide, and was hacked to pieces with swords, another of their party was killed by the Biluchis, and they heard that a traveller had been murdered previous to their own capture. At the end of three days the two men whom I met with their wives were released near Chasma Shutaran, the lonely spring in the desert where I filled my water-bottle. They came on to Robat-i-Khan, and were anxious to proceed on their journey.

I here heard of the mode of procedure of these Biluchi marauders. The camels they ride travel very fast. They can go 70 or even 80 miles a day, carrying one or sometimes two men and a little food. The longest distance that I have ever myself known a good trained camel to cover in a day was 92 measured miles on a road. This was accomplished between early dawn and evening, but the camel performing this feat would not have been able to go on the next day for any great distance. This was, however, not a Biluchi camel. The Biluchis, with their trained camels which only require water every other day, and who can on a push last for three days without water, scour the country for incredible distances, lying hidden in some ravine in the desert, and pouncing upon unwary travellers, and driving off camels and cattle wherever found. Sometimes a rich caravan falls into their hands. Their camels can find enough grazing, in the less arid spots of the desert, to support life, assisted by a little food supplied by their owners in the form of balls of barley-meal mixed with just enough water to make a paste. A camel can exist in this way for a few weeks only while the foray lasts. The Biluchis only approach some lonely spring in the desert every other day, water their camels, fill their water-skins, and go back to hide in some new spot.

On the second day of my stay here, a man came running in, declaring that as he was gathering assafœtida on the hills above Chasma Shutaran he saw a large body of Biluchis, whom he estimated at sixty, come to the spring, fill their water-skins and go off; and that he had left his assafœtida lying on the ground to run in and give notice.

Assafœtida is produced in great quantities on the edge of this desert. It is a stinking gum which exudes from a desert plant when it is cut. The season for collecting it lasts about eight months, from spring until autumn. A plant can be cut fourteen times in one year, and the gum which exudes from the wound is carefully collected. The Persians know no use for assafœtida, and asked me what was done with it in India. I said it was used in medicine, and that a very small quantity was employed as a flavouring to certain kinds of food by the natives in India. I was then asked if I had ever tasted food so prepared, and on my answering yes, and that I thought it rather nice, I was looked upon with horror by the bystanders.

After three days' delay I found a camel man named Aly Kuli Khan, of Nain, who declared his determination of proceeding. He was taking a caravan of laden camels from Yazd to Birjand, and he said he would lend me a spare camel for my load. We marched off very secretly, not letting the people of the village know by what road we were going. All the camels' bells were removed and every precaution taken to prevent noise. The padded feet of the camels made no sound. We left the road and travelled all night across country over some very rough ground, crossing a difficult pass for laden camels. We started as soon as it was dark, about half-past six, and did not get in until half-past eight next morning, having taken 14 hours to do 30 miles; but we had got past the Biluchis, or the place where they were supposed to be. The next day we went on to Chardeh, a group of four villages, in the Tabbas district.

The real desert is supposed to terminate at Tabbas, and the immediate neighbourhood of that place is fairly fertile in consequence of a good supply of water. In any other country I should have called Chardeh a very poor place, but there was good water to drink, which after all the nasty stuff I had swallowed, containing various sorts of salts, was a pleasant change. Date palms, which are the commonest trees at Chardeh and Tabbas, are not beautiful, but after seeing no trees at all they are quite refreshing. Much tobacco of a good quality is grown at Tabbas, and exported, besides a small quantity of silk and a great deal of assafœtida. Camels and sheep are numerous in the country northward of Tabbas, towards Mash-had, but nothing at all is produced in the desert country I had travelled over except assafœtida. The group of four villages known as Chardeh, are Jowcar, Tugianun, Tuskinun, and Madiabad, containing altogether about 800 inhabitants.

On the 29th October I rode into Tabbas, which is 10 miles from Chardeh, over a sandy plain. This place, I believe, had not been visited by any Englishmen before my arrival, except by Colonel Macgregor some six years previously, though it has been visited by several Russians, especially those of Khanikoff's mission.

Sir John Malcolm has thrown a sort of halo over Tabbas by his description of it and its ruler in his history of Persia, but it is really a very ordinary town. A portion of it is fortified with a deep ditch and walls, stronger and in better repair than is usual in Persia. The gates are also thickly plated with iron, and though of course not a strong place, it is in better order than most Persian towns, where, if the gate is strong enough to resist being kicked in by a Turkoman's horse, it is considered sufficient. The fortified portion contains about 5000 inhabitants, but the mass of the people live outside. There is a wide street outside the town which has rather a fine appearance. The mass of the population live beyond the walls. The country of Tabbas is ruled by an hereditary governor, who is nevertheless appointed by the Shah, but always from the same family. The present incumbent is named

Mahomad Bakhir Khan, and has the title of Imad-ul-Mulk, or Pillar of the State. He is notorious for his stupidity, and many amusing stories are told of him, such as that when he was once trying a horse he called for a looking-glass to see how it looked when galloping, and so forth.

In the town is a very fine minaret, the largest and highest I have ever seen, but it is fast going to ruin. I purchased a mule here to replace my horse that was laid up. I suppose the bigotry of the Mahommedans of Tabbas cannot be equalled except at Riad, the Wahabi capital of Central Arabia. The people see no one, and there is not even the amount of civilisation which would come with a governor appointed from the capital with his following of people, who had seen something of European civilisation.

I had entered the town rather afraid of being discovered to be a European, as I had not yet got quite accustomed to my assumed character as an Armenian, and feared the superior astuteness of townsmen. But I need have given myself no uneasiness on this score. I had only just arrived at the caravanserai when the keeper of it came and said we could not stay there, as it was the khan's or governor's orders that Christians should not be allowed to halt there. If they had known I was an Englishman no doubt they would have received me civilly, but to Armenians or any sort of Christians that they dared to treat in this way they would not give even a lodging. I did not mind this in the least; I had seen all I wanted of Tabbas, and rode back to Chardeh well pleased to find that my disguise was not detected: after this I felt quite at home even in a town.

The next day I marched towards Sultanabad, the capital of the Turshiz district. Near Tabbas there are three ranges of mountains;—the Shutari range, the highest peaks of which rise to a height of probably 10,000 feet; the Nastandji, some 2000 feet lower, and the Shorab range lower still. The first march is to Shirghist, about 18 miles. The road passes over a barren, sandy plain, between the Shutari and Nastandji ranges, until near the village, when it runs through an opening of the Shutari.

Shirghist is a very small village with a spring of good water. At the point where the road passes through an outlying spur of the Shutari range, another road branches off to Deh Mahomad and Bajistan. The road from Shirghist runs about 30° east of north, skirting the Shutari Hills for some six miles; then a spur is thrown out from the range which is virtually a continuation of the Shutari, but which is not known by that name. In fact it has no name, but as is usual in Persia, each part of the range has a different name, usually that of the neighbouring village.

Travelling 13 miles a group of small villages is reached, the nearest to the road being Pushna Darun. On the following day I marched over a rather barren country, but far from being desert. About four miles to the left of the road the town of Dasjirdun was seen. From Dasjirdun, which is, I hear, a thriving place, there are roads directly across the desert to both Shahrud and Damghan. This is the desert road from Tabbas to Teheran, and almost all the tobacco which is exported to Teheran is sent on camels by it. My informant, who had travelled by the road, said that it was 12 marches for camels from Tabbas to Damghan. Two of these marches were from Tabbas to Dasjirdun, then follow eight marches of from 20 to 24 miles each, with water at each stage, to a small village called Tahrud, and finally two marches to Damghan. He said horsemen never travelled this road as they could not procure food for their horses. He also said that though much kavir was skirted none was crossed by this road. But by the road from Khūr to Samnan or Damghan, he heard there was much kavir, though he had not travelled along it. I passed a flourishing village called Deh Noband at 14 miles distance, and stopped at a wretched little hamlet named Abid, with brackish water, a few miles further on.

On the 3rd of November I marched to Zangi Chah, a miserable village which produces nothing but assafœtida, but has a good caravanserai. Here I saw the largest tract of kavir I have yet seen. It extends, I am told, for more than 100 miles in length, and is some 25 to 30 miles in breadth near here. Fortunately the road does not cross it. A few days previous to my arrival the Biluchis had made a most successful attack on a caravan of 200 laden camels at a place 20 miles from here, and carried off goods to a large amount. The value was stated to be 4400*l.*, but that doubtless was an exaggeration. Of the fact of the attack and plunder of this caravan there could be no doubt, as I met, a few days later, great numbers of the poor people who had been plundered of everything and stripped of all but the barest necessary clothing.

The alarm about these Biluchis is great all over this part of the country, and it is very disgraceful and quite unusual that they should be allowed to plunder so far in the interior of Persia as this place. I heard that the 200 stolen camels and the less valuable portion of the goods were recaptured by the Amir of Kaian. None of the people with the caravan were killed. Biluchis very seldom kill; Turkomans almost always kill those they cannot carry off.

I marched the next day to Abdullabad in the Turshiz district, a distance of 34 miles. It was a great pleasure to get into a fertile part of the country again, after all the dreadful desert I had been passing over, and to see green fields and people ploughing. Near Abdullabad is the site of a city called Firozabad. Some minarets which have been covered with various coloured faience are all that remains of the city. The walls and gates can be traced in some places. It was destroyed by the Amir Timour. My next march was through a fertile country to a very flourishing village called Khalilabad, 22 miles distant from Abdullabad. Two small canals from the Shisdraz river were crossed at the village of

Kundur. This river was said to be situated about four miles away, and called Shisdraz because after emerging from the mountains it was divided into six small channels or canals, two of which pass Kundur. Khalilabad produces much silk of a good quality. The mountains to the northward of the Turshiz plain are known as Bejwird Kuh and Siah Kuh, those to the southward as Begou Kuh.

On the 9th of November I reached Sultanabad, the chief town of the Turshiz district. All maps mark a town called Turshiz, but there is no such town, it is only the name of the district. Sultanabad is a small but flourishing town of some 5000 inhabitants, with a good deal of trade, silk and wheat being the chief articles exported. The next day I marched only five miles, to Furk, a village on the edge of the Turshiz district, and the day following 23 miles to Kushdurreh, a very fertile village in the Turbat Hidari district. I crossed the only running stream of water of any size which I had passed since leaving Ispahan. It is situated 18 miles from Furk, and about four miles from the small town of Askand, and is called Askand Rud. The water in the stream even at this dry season is about 50 feet wide. It runs with a rapid current in a course nearly due north and south at the point where the road crosses it. Judging by the width of its bed and the depth to which it was eroded, I should think that in spring it must bring down a large volume of water. It is said to rise in the Derby Mountains, near the Surkh Kuh range, but not from them. It passes through the Siah Kuh range and forms, I am told, a waterfall. It is used up in irrigation near Faizabad, a place to the southward. No doubt the water of this stream, with perhaps some help from the Shisdraz stream, is the cause of the great kavir which I saw near Zangi Chah, and which extends towards Faizabad.

I marched to Turbat Hidari, distant 18 miles, on the 13th of November. At Turbat Hidari I got into a comparatively beaten track which has been described by several travellers, so I will not describe the road thence to Mash-had. I marched it in four days and halted a few days near the town. I did not enter Mash-had, but rode past it and got on to the Kuchan or Kabuchan road. This road runs in a valley between two ranges of mountains; those on the left hand are the most lofty, and are called Binalud. The range of mountains on the opposite side of the valley is not nearly so lofty, though one peak, Hazar Masjid, or the thousand mosques, which gives its name to the range, is nearly as high as any peak in the Binalud range.

The first day after passing Mash-had I halted at a village called Kazimabad, 10 miles distant, and the next at Shangullah. The plain over which I am now passing is very fertile indeed, and this part of Khorasan may be looked upon as the granary of Persia. The villages in this neighbourhood are strongly fortified, and the forts are all kept in good repair and not allowed to fall into ruin like so many forts in more peaceful parts of Persia. I here heard of a Turkoman foray having taken place to the south of Mash-had in the district known as Barkharz, 3000 sheep and some 30 of the inhabitants having been carried off, and a captured Turkoman blown from a gun. On the 22nd November, I marched to a small town of about 4000 inhabitants, called Radkan, distant 27 miles. Before reaching this town a marsh is passed which is one of the sources of the Kashaf Rud. This river, after watering the Mash-had country, falls into the Hari Rud. On the edge of the marsh, and about one mile from Radkan, a very curious tower is seen, standing on rather high ground, and probably intended as a hunting tower. It is very lofty, and probably very ancient; constructed of small red bricks; the outside being composed of fluted brick columns, beautifully built. It formerly consisted of three storeys, the flooring of which has fallen in, and had a platform at the top evidently for a look-out. There are no loopholes or openings of any sort except two doors at the bottom. The roof had been of blue encaustic tiles, and an inscription in enormous Cufic letters had run round the building, but though the form of letters could be traced just enough to show in what characters they had been, nothing could be made out of them.

Radkan has a deputy-governor of its own, and is a poor, miserable town. A splendid breed of camels is met with in the district. The Khorasan camel is celebrated for its size and strength. It has very long hair, and bears cold and exposure far better than the ordinary Arabian or Persian camel. The best animals are a cross between the Bactrian or two-humped and the Arabian or one-humped camel. The first cross is by far the best. The load of an ordinary Persian camel is generally 320 lbs., of an Indian camel 400 lbs., but one of the Khorasan breed will carry 600 and even 700 lbs.

In India a wonderful ignorance prevails about camels, and they die by thousands in every campaign. Our natural history books teach us that camels can go without water for long periods, and that they can live on the scanty thorn bushes of the desert. This is far from being the case; camels should be watered at least once a day if possible, and they cannot go more than three days without water, except when trained to do so, and then they suffer much, and many die. A camel which is in good condition, and has a fat hump, will manage with wonderfully little food for a fortnight or three weeks, but if the system of little food is continued much beyond the latter period he simply gets ill and dies. A camel requires nearly as much food as a small horse, though the food may be of coarser quality. He prefers thorny bushes, twigs and leaves, but when these are not procurable he must have at least 5 lbs. of grain and about 17 lbs. of chaff daily, or he very soon dies. Deserts are crossed by camels, but the line of camels' bones along the road attest at what cost to the animals.

From Radkan I marched to Dautli, distance 22 miles; the road skirted the hills, just keeping in the plain. The men of Dautli were Turks, they said, brought from Azerbijan and settled here. I never saw finer specimens of humanity. After this country was almost depopulated by Jenghiz Khan in the 13th century, it remained very sparsely inhabited until Kurds and Turks from the western provinces of Persia were settled here by Shah Ismail and Shah Abbas the Great of the Sufevian dynasty, in the 15th and 16th centuries, to act as a barrier against the Turkomans, who then as now were the curse of the country.

I here left the Kuchan road, which is 13 miles from Dautli, and turned off towards Daragez. At a distance of eight miles the village of Badkhor is reached. A stream, forming the head waters of the river Atrak, passes Badkhor and runs to Kuchan. The road follows its bank for about two and a half miles, when the village of Towarik is reached; here the road turns away from the stream. I did not follow it up to its source, but it is said to rise in the Hazar Masjid range of mountains, not many miles beyond Towarik, and is acknowledged to be the source of the Atrak. Soon after leaving Towarik the ascent of the Maidan Kuni Pass is commenced. The plateau at the top of the pass is known as Maidan Kuni or the Bloody Plateau, from the number of people who perish here during the winter when trying to cross over during the heavy snow. This is the easiest road into the district of Daragez, which is situated across this mountain range; but for weeks in the winter, when there is snow, there is no communication between Daragez and the rest of Khorasan. The other road by Kalat-i-Nadiri is, I am told, worse than this one, and blocked earlier in the winter by snow.

This plateau is the watershed, the rivers which take their rise on its western side flowing to the Caspian Sea, while those which have their sources on its eastern face are lost in the desert, not even reaching the Tejend. From Maidan Kuni a very good view is obtained of the Hazar Masjid Peak, which rises in vast grandeur to a height of 10,500 feet. The Mahommedans say that there are a thousand mosques, one for each prophet who has come into the world. Hence the name Hazar Masjid, or thousand mosques. As soon as the Maidan Kuni Plateau is passed there is a sharp descent, and then there are three small villages of the name of Derbendi, the commencement of the Daragez district; the Maidan Kuni Pass separating it from the Kuchan district. From Derbendi I continued to Mahomadabad, the capital of the Daragez district, crossing the Allaho Akbar Pass *en route*. The Allaho Akbar is lower than the Maidan Kuni Pass, being only 4200 feet high, and it can almost always be crossed without difficulty even in winter. The road is bad to the crest of the pass, after that there is a good hill road. There is a fine view from the Allaho Akbar Pass. Several low ranges of hills cross the Daragez plain, but no mountain ranges, while beyond, the Turkoman plain is seen extending away to the blue horizon. In every direction villages and cultivation are seen, showing it to be a fertile land; and every one says, "If we had only peace we should indeed be rich." But in every direction the plain is dotted with towers, as refuges from the dreaded Turkoman.

After descending to the plain the flourishing village of Chapashli is passed. Chapashli is surrounded by vineyards, which are famed all over the country. Grapes are so plentiful that 45 lbs. of the finest can be purchased for ninepence; but there is a reverse to this picture: only eight years ago it was suddenly attacked by a large body of Turkomans, who killed or carried off into slavery more than 300 of the population.

Near the village of Hakwerdi, a little further on, the refuge towers are very close together, every square of 150 yards of the fields having one. In other parts of Khorasan I had seen a few of these towers, but here the whole country is so thickly dotted with them as to look like a chess-board covered with chessmen. The towers are small, round buildings, built of unbaked clay, about 12 feet high. They are roofed over, and have no opening whatever except a small round hole at the bottom, through which a not too stout person may wriggle himself in like a snake. If surprised by Turkomans, the cultivator or traveller creeps through this hole, and closes it with two large stones, which are there for the purpose. Even if these stones are wanting, the occupant is safe, as it would indeed be a daring Turkoman who would try and force himself through the hole, with the certainty of having his brains beaten out with a stone while struggling to get through, even supposing the person inside had no better weapon, but almost every one here goes armed. The defence towers are higher and larger, and have a parapet at the top, with loopholes to fire through, and a ladder for ascending to the top. Each vineyard or orchard has its one or more towers.

I stayed a considerable time in Mahomadabad and other parts of the Daragez, viz. from the 25th of November, 1880, to the 15th of January, 1881. I rented a house, and was given a shop in the bazaar, which I accepted but never opened. Mahomadabad is a particularly good place at which to obtain information of the Turkomans, as the Daragez district lies between the Akhal Tekke and Merv Tekke Turkoman country, and the shortest road from one to the other leads through Lutfabad, a town 14 miles from Mahomadabad. In the bazaar there are always numbers of Akhal Tekkes buying and selling, Mahomadabad being the town where they purchase all they require. Askabad, one of their largest settlements, is only two marches off. From the Merv country many caravans come in, and I saw and spoke with many Merv Tekke. I used to wander about the bazaar, conversing with the people. Mahomadabad is a bilingual town, every one speaking both Persian and Turki.

II.

The Daragez district has a length of some 65 miles, and a breadth of about 40. There is a governor appointed by the Shah, though the appointment is hereditary in one family; he bears the title of Begler Begi, and the people speak of him familiarly as the Khan. His name is Mahomed Aly Khan. He is of Turk descent, as are a large portion of his subjects. There are also many Kurd villages, but it is a distinction to be a Turk.

Nadir Shah, the last king who ruled Persia in its full extent, from Georgia to Candahar and from the Tigris to the Oxus, was born in a tent of an Iliat, or tent-dwelling family, of the Afshar tribe, about one mile from Mahomadabad. He built a small fort (now in ruins) to mark the place of his birth. At present it is only the wild tribes who plunder Persia, Bokhara, and Afghanistan that are called Turkomans; but the name had once a much wider signification, and there is really no ethnic difference between the civilised Kajar tribe, to which the royal family of Persia belong, and those now called Turkomans. In the 'History of Nadir Shah' called Jehangosha, written by Mirza Mehdi Khan Astrabadi, he is always spoken of as a Turkoman of the tribe of Afshar. Nadir Shah himself, in a letter to his son, speaks of having treated the Emperor of Delhi with courtesy when he captured that city, because they were both of illustrious Turkoman descent.

We also know that the Turkomans of the white sheep and the Turkomans of the black sheep—so called from the figures of these animals that they carried on their standards, and who had their respective capitals, the one at Diarbekir in Kurdistan, and the other at Van in Armenia—were of the same race as the nomads of the Kara Kum desert. The Turkomans speak a variety of Turki differing very little from the Turki spoken all over Northern Persia, and the Turks of Persia understand it, though there are some differences. The Persians call the Turki spoken by the Turkomans, Jagatai.

The Turkomans inhabit the country between the Caspian Sea and the river Oxus. This country bears no general name, and a great part of it is taken up by the sands of the Kara Kum or Black Sand Desert. It is bounded on the north by the kingdom of Kharezm, or Khiva, and on the south by Persia and Afghanistan. There are a few Turkomans in Afghan territory, and a few also across the Oxus in Bokhara. The country inhabited by the Turkomans is watered by two considerable rivers besides the Amu or Oxus, which bounds it. One of these, the Murghab, takes its rise far away in the Safid Kuh or White Mountains, in Afghanistan, and, after a long course, loses itself in the sands of the Kara Kum Desert. Before doing so, however, it fertilises a long, narrow strip of country on its banks. This tract of country, from the point where the Murghab leaves Afghan territory to the point where it is lost in the desert, has always been celebrated in Eastern history as a most fertile land.

Meru, or Merv, the city on the Murghab, is mentioned in the earliest records of the Aryan race. Balkh, Merv, and Seistan were the places where Iranian history begins. The country watered by the Murghab and Tejend rivers was known to the Greeks as Margiana, and it was visited by Alexander the Great, and Antiochus Nicator ruled on the Murghab. However, we need not dwell on these old world histories, which I have only alluded to, to show what Merv was long ago. It was the seat of a Christian archbishop of the Nestorian Church during the reigns of the Sassanian dynasty of Zoroastrian kings of Persia, as was also Toos near Mash-had in Khorasan. I was much interested in trying to discover remains of the numerous Christian churches in this country, which the presence of two archbishops would presuppose.

At a village called Julfan, some 12 miles distant from Mahomadabad, a mound was pointed out to me called Tepe Kalisa, or the church mound, where tradition says a Christian church had stood. I visited the place, and found some ruins, but nothing that could enable me to form a definite opinion as to whether it was a church or not. *Kalisa*, which is only a corruption of *ecclesia*, is never used by these people except for a Christian church. It was curious that the neighbouring village should have borne the name of Julfan, for Julfa on the Araxes, and Julfa the Armenian quarter of Ispahan, are both Christian towns. The people of this village of Julfan said the tradition was that it had been a Christian village, but that it had been destroyed by Jenghiz Khan in the thirteenth century, and that they themselves were Kurds brought from the west to repeople the deserted village. Also in a route kindly furnished to me from Mahomadabad to Mehna, near the Tejend, by Mr. O'Donovan, the *Daily News* correspondent, he mentions three villages as Khodja Kalisi, Akmanat Kalisi, and Kara Khan Kalisi. I cannot help thinking that all these places have taken their names from the ruins of Christian churches being situated near them. They are between Kahka and Mehna on the Persian border. It would be very interesting to search for the ruins, and find out if this was the case.

The Arabs captured Merv about A.D. 666, and found it a very rich city. Until this time it had a Christian archbishop. At the time of the Arab conquest the Salor and Saruk tribes of Turkomans were in the country. The lieutenants of the Khalifs of Baghdad ruled Khorasan with Merv as their capital. I have not space to enter into the history of Merv in the time of Sultan Sangar.

On the 25th of February, 1221, Merv was besieged by a Mogul army, under Tului, a son of Jenghiz Khan; the place was captured, and the population put to death with very few exceptions. It is said by Ibn-ul-Ether that 700,000 dead bodies were counted. This is probably an exaggeration, but it shows how large a city Merv must have been that a writer could suggest that 700,000 people were put to death in it. The Moguls had a curious and methodical way of numbering the slain. When a thousand dead had been completed, they placed one body with its head buried in the ground and its feet upwards, so that the thousands might be conveniently counted.

The last Merv was the city so bravely held by Bairam Ali Khan Kajar. A branch of the Kajar family who now rule Persia had been placed in Merv by Shah Tamasp to defend this outlying province, as they were renowned for their courage. During the troubles that followed the death of Nadir Shah, Merv was attacked and captured from the Persians by Begge Jan, called also Amir Māsum, the Amir of Bokhara, in 1784. Bairam Ali Khan was slain outside the town, and his son Mahomad Hussain Khan, who made a glorious defence—even the women joining in it—was carried captive with the population that were spared, to Bokhara. Since that date there has properly been no such town as Merv. The Merv country still exists, but there is nothing worthy the name of town there. The Amir of Bokhara broke down the great dam on the Murghab which filled the numerous canals and fertilised the whole country, in the hope of rendering it a desert inaccessible to Persia. After 1784 it belonged to Bokhara for some years, and the Salor and Saruk Turkomans encamped on it. It was subsequently taken from the Amir of Bokhara by the Khan of Khiva, whose officials were found here living in a poor village called Merv when the place was visited by Abbott early in 1840. This place, which was a possession of the Saruk tribe, and which is described by Abbott as consisting of about 100 mud huts, has been destroyed by the Tekke Turkomans, who began to settle in this country about 1830, and finally drove the Saruks further up the Murghab to Yulutan and Panj Deh. I have not been able to discover the date of the destruction of this last and most wretched of the places which have borne the name of Merv, but it was probably about 1855. This deserted place was occupied by Persian armies in 1857, under Sultan Murad Mirza Hissam-i-Sultunut, and again in 1860 by Hamza Mirza Hashmat-ud-Dowlah, whose army was disastrously defeated in an attack on Kala Kaushid Khan, then only just commenced and in a very rudimentary state. The Tekke Turkomans have possessed themselves of the best part of the country. They have built a large fort on the eastern bank of the most westerly branch of the Murghab. It is situated 25 miles below the great *band* or dam which divides the Murghab into many canals or branches. The place where the great band is situated is known as Benti. Here is also Allahsha, where there is a ferry over the Murghab, which is used for a few weeks in the spring when the river is in high flood, at other times there are wooden bridges.

The fort of Kaushid Khan, which is very strong indeed, is protected by the Murghab river on two sides, being built in a loop of the river.

It is about 2½ miles long and 1¼ wide. The Tekke have most wonderful confidence in the strength of this place, which will contain, they say, 50,000 alajaks or Turkoman tents. It is called Kala Kaushid Khan, from the name of its founder, Kaushid Khan, the chief of the Beg clan of the Tekke tribe. It was commenced in 1860, and the Tekke have worked at it by fits and starts ever since.

When the Persians now speak of Mour or Merv they mean Kala Kaushid Khan. Turkomans themselves never speak of Mour as a town; when they use the term at all they mean the district where Merv was formerly situated. The fact of the Persians speaking of Merv as a town, and as a place captured by their armies, has led to endless confusion. There is no sign of a town about Kala Kaushid Khan. There are about 6000 tents of the Beg tribe generally pitched near it, and each chief man has a guest-house of mud or sun-burnt brick, but they themselves live either in felt tents, or in places where reeds are plentiful, in reed or mat-huts, which can be carried away on camels. Near Kala Kaushid Khan there is a boys' school, with five or six houses for the mollahs or priests who teach in it, belonging to Mollah Turah, the chief mollah of the Beg tribe. A market is held on the river bank, near the fort, and here the Jew traders who frequent the place, each trader being under the protection of some powerful Turkoman, have built small open enclosures without any roofs, where they expose their goods for sale on the two days in a week when a market is held.

When Persians speak of the bazaar of Merv they mean this open market place. Inside the fort some alajaks are pitched, and the family of Kaushid Khan have a guest-house there. The fort, however, is kept more as a place of refuge than as an ordinary habitation. From what I could gather, the portion of country fit for cultivation is about 90 miles long and extends to about eleven miles on each side of the river. The ground is very fertile and produces melons and water melons in plenty, and of great excellence. Melons constitute one of the exports to Daragez, both fresh and dried. Even in Mash-had the melons of Merv are much liked, and are sent by rich people as presents to one another.

General Abbott, who visited the country in 1840, says, "The profusion of water renders the soil productive, but it has not strength to bear any but the poorer sorts of grain." In a previous paragraph he says, "During the misrule and anarchy of the past sixty years the ancient dam of the Murghab was neglected and carried away. The dam is again set up and the lands are brought under culture." I gather from this that the dam had not long been repaired when Abbott saw it. Every one knows that in Eastern lands the sandy desert is soon rendered fertile by the silt brought down by the rivers when it is irrigated, and relapses into desert when unirrigated. For the first few years after cultivation these desert tracts are poor, but they soon improve. Vambery makes this remark of some lands on the other side of the Oxus, but it equally applies in the present case. I can only suppose that the land has again been rendered fertile by the silt brought down by the Murghab, for all Turkomans and Persians who have visited it agree in saying that the Merv country is now a most fertile land. We have an instance, familiar to many of us, of desert being fertilised, in the inundations of the Nile. In Egypt, where the irrigating canals do not reach there is desert; so it is in the Merv country.

I will now leave the Murghab river and describe the Hari Rud or Tejend. The Tejend river has a longer course than the Murghab, and rises far away in Afghanistan, in fact, I believe that some of its head waters are situated in the western slopes of the Koh-i-Baba, near Kabul, but of this I speak with some doubt. The river passes near and waters the Herat plain. After passing the Afghan fortress of Ghurian it turns northward, and from Toman Agha to Sarakhs forms the boundary between Persia and Afghanistan. As a matter of fact, very little is known of the river between Toman Agha and Pul-i-Khatun, as this portion of the country is so infested by Turkoman bands that it is very seldom visited by any one else. From a few miles beyond Sarakhs both banks of the Tejend are Turkoman.

Many small streams from the mountain ranges of Daragez and Kalat-i-Nadiri run towards the Tejend, but none of them reach that river. I believe that in former times they did fall into it, but that now they are diverted for irrigation and are lost in the desert before reaching the Tejend. The Tejend is described by a friend of mine, who crossed it near Mehna, as being ordinarily fordable at all points below Sarakhs. In the spring, from the melting of the snows in the mountains, it is for a short period unfordable. He says that when he crossed it last February the water reached to his horse's stomach. The river bed was sunk about 12 or 15 feet below the level of the surrounding country. Immense quantities of driftwood covered its banks, and at each angle of the stream trees grew in abundance. There was little or no grass when he saw it in winter, but he said no doubt there would be plenty in the spring and summer. The Kashaf Rud, which passes near Mashhad, falls into the Tejend, and is one of its most considerable affluents.

The country bordering the Tejend has never played the same part in history as the Merv country. The only town of much importance on it in ancient times was Syrinx. In modern times Sarakhs, a town situated on the eastern bank of the river nearly opposite the present Persian fort of the same name, which is situated on the western bank, was a town of considerable importance. It was destroyed in 1830 by Abbas Mirza, the Persian Crown Prince, and many of the inhabitants killed; the remainder were carried away captive and settled by the Prince within the Persian border, but as they made themselves disagreeable to the Merv Tekke by giving notice of raids, they were all carried away by them, whether with their own consent or not I was not able to ascertain, and distributed among the Tekke in the Merv country. The whole Salor tribe do not now number more than 5000 tents. The Tejend, like the Murghab, is finally lost in the sands of the Kara Kum Desert.

Formerly a great deal of the country now desert, between the Tejend and the Murghab rivers, was cultivated by means of canals from the Tejend, and these canals used to reach as far as Kucha Kum in the desert, rendering the journey much easier than it is at present.

I will now give an approximate estimate of the strength of the Turkoman tribes. This is pretty well known, as they are often mustered in war, and each tribe has a pretty accurate idea of its fighting strength, which may be considered as one fighting man for each tent.

Akhal Tekke in Daman-i-Kuh, now belonging to Russia	25,000	tents.
Merv Tekke on Murghab and a few on Tejend river	40,000	„
Salor (5000 tents) but included in Merv Tekke.		
Saruk at Yulutan and Panj Deh on Murghab river	11,000	„
Total	76,000	„

The number of inhabitants per tent may be taken as five. This will give for the Daman-i-Kuh and Merv country a population of 380,000, and I do not think this is an excessive estimate.

Besides the above, there are Eyrsari Turkomans on the left bank of the Oxus, who may be reckoned at 75,000 tents, or 375,000 persons.

These are all the Turkoman tribes of which I have any personal knowledge. I will, however, just mention the other chief tribes:—

Yomuts, near the Caspian Sea and Atrak rivers.
Chowdur, near Caspian Sea and Khiva.
Goklan, near Atrak river.
Kara, in desert beyond Murghab.
Alhehli, near Andkhoi, in Afghanistan, and also at Abiverd and Khaka in Persia.

Of these tribes I can give no estimate that would be worth having; I did not come in contact with them except with some of the Alhehli, many of whom have settled near Abiverd and Khaka within the Persian border; they are none of them powerful except the Yomuts.

I will now describe the country inhabited by the Akhal Tekke tribe: this is called Daman-i-Kuh, or skirt of the hills. It now forms a part of the new Trans-Caspian province of Russia. It is rather a bare strip of country, bordering the range of mountains which form the boundary of Khorasan on the north. Though it is not a rich country, it is far from being a desert; there are many small streams which run down into it from the mountains, and enable the plain to be cultivated. It extends from Kizil Arvat to Gawars. The small streams are soon lost in the desert, and beyond their influence there is no cultivation.

The new capital of the Trans-Caspian province of the Russians has been fixed at Bami, in the Akhal Tekke country, and a railway is being constructed from Mikhailovsk on the Caspian to Bami. The best proof that this country is not desert is, that it supported a population estimated at 25,000 tents or families, or 125,000 souls, and that these people were able to keep up a large number of horses of a very good breed; sheep are also kept in this tract in very large numbers. The fisheries of sturgeon and other fish for caviar on the Caspian coast of the new province are valuable. Petroleum is found, and when bored for, will no doubt be produced in as great quantities as at Baku on the opposite coast of the Caspian. The island of Cheleken, near Mikhailovsk, produces not only petroleum, but mineral wax in large quantities, which is a very important and valuable product.

In a rough way the Tekke Turkomans have a knowledge of the arts. They manufacture carpets that cannot be surpassed or equalled in Persia, and are similar to the ancient Persian carpets which fetch so large a price, and cannot now be made in Persia. They have powder mills worked by water-power which turn out very good gunpowder; and they are clever in manufacturing false Persian money, with which they flood the bazaar in Mahomadabad. Their felts, and the rough cloth they manufacture from sheeps' wool, are far superior to any made in Persia; and they also make a stuff that looks something like alpaca, only thicker, which fetches a high price. Aniline dyes, which are ruining the Persian carpets, have not yet reached the Turkomans, and as the materials they use are good, the carpets last almost for ever. In fact, everything the Turkomans make, except their money, is thoroughly good.

My stay in Daragez was rather eventful; on some five occasions I heard the call from the top of the mosque, "Turkomans! Turkomans! mount and away!" which is the call for the Governor's cavalry to mount and proceed in hot haste in pursuit of bands of these marauders who were carrying off slaves or cattle. No one in England has any conception of the fearful sufferings of this slave trade carried on by the Turkomans. I believe the number of slaves in Bokhara, Khiva, and the Turkoman country itself a few years since amounted to more than 100,000. Of course it is difficult to gather statistics on such a point, but 40,000 slaves are said, I do not know with what truth, to have been released by the Russians in Khiva alone. The value of slaves has fallen considerably since the Russians have closed the slave markets in Khiva and Bokhara. The Persian slaves in Bokhara have not been released, but the open sale of captives there has been prohibited, and though a few slaves, especially women, can still be secretly sold in Bokhara, Russia has struck a great blow at the Turkoman slave trade. The noble deed performed by that Power in releasing the numerous slaves in Khiva has added very much to her influence in this part of

Persia. In almost every village I met liberated slaves, who spoke of the kindness of the Russians in freeing them. Great numbers of the freed slaves were killed by the Turkomans on their return journey from Khiva.

Formerly the great slave-catching place was on the caravan road between Teheran and Mash-had near Miandasht. From this neighbourhood many slaves were carried off, often people of good family. An Indian princess was so captured, and I believe died in consequence of the ill-treatment she received. The sufferings of the poor slaves while being carried off is terrible, as they are lashed on a horse's back behind their captors, often wounded while being taken prisoners, and are allowed very little rest, night or day, until they reach the Turkoman tents. They are then heavily ironed, a ring being passed round the neck and one round each leg. From these rings there are chains fastening the legs together, and a long chain from the neck ring which is fastened to a tent-peg. I saw prisoners fastened in this Turkoman manner at Mahomadabad.

Women slaves are preferred. Imagine the feelings of a young woman of good family, torn from her friends and relations (probably after seeing her husband killed in defending her), and carried ruthlessly away. She who has never even shown her face, is stripped and offered for sale. Fortunate for her if she is not pretty, for then her friends may be able to ransom her. If beautiful, her captor will probably not part with her at any price. I am not painting a picture, but depicting scenes of almost daily occurrence.

The presence of the Russians across the Atrak has rendered the road from Teheran to Mash-had now safe, but slave-hunting is still carried on in Daragez and the country on the east of Khorasan. Though the closing of the slave trade in Bokhara and Khiva has lowered the price of slaves they are still valuable for work in the Turkoman country and for ransom by their friends.

The Turkomans almost always kill all they cannot carry away captive. If pressed in pursuit they cut off either the hands or feet, or both, of the captives and then leave them. I know of a well authenticated case of their doing this to a number of their captives.

At the end of December I heard that the Begler Begi, or Governor, was going on an expedition into his district in the direction of Askabad. I asked leave to accompany him, and he permitted me to do so. We started with an escort of about 50 cavalry and stopped the first night at a village called Nakundan, about nine miles from Daragez. Here I had long talks with more liberated slaves from Khiva. They said their treatment had been good when once they reached their owners' hands, but the journey was terrible. The next day I visited Julfan and Tepe Kalissa, or the church mound which I have before spoken of. I turned back from near a village called Tojanlu, about 15 miles from Mahomadabad, and went and met the Begler Begi at a shrine to the left of the road, where he had been paying his devotions. He told me he had received news that 6000 Tekke Turkomans were on their way to Yangi Shahr, or Geok Tepe as it is called in Europe, and that he was most anxious, as he feared they would plunder some of his frontier villages *en route.* He said he must return that day to Mahomadabad, and that he had summoned every available mounted man in his district to meet the expected inroad. We returned to Mahomadabad, and the next day the Begler Begi, having collected some 400 cavalry, started for Lutfabad.

Lutfabad, sometimes also called Babagek, is a small town in the Atak country. The plain country is called Atak; it is well watered and very fertile, but dreadfully harried by the Turkomans. It forms a portion of Daragez, and the deputy governor is a brother of the Begler Begi named Syd Aly Khan.

I was hospitably entertained by Syd Aly Khan, as was also Mr. O'Donovan, the *Daily News* correspondent, who had also accompanied the Begler Begi. I had by this time made myself known to Mr. O'Donovan as an Englishman. For about three weeks, though I had seen him constantly, he believed me to be an Armenian, and always called me Khwaja Ibrahim, the name which I had adopted. One day he said to me, "Really, Khwaja Ibrahim, you speak English wonderfully well for an Armenian." I kept my countenance and said, "Oh, we Armenians of Calcutta receive a very fair education." It is certainly a great feat in newspaper enterprise to maintain a correspondent in so good a position to obtain news of what is happening in the Turkoman country. Mr. O'Donovan is at present a prisoner in the Merv country,* but he is in no danger, and will doubtless be in a position when he returns from his wonderful journey to give us valuable information. I did not much fear detection by a European, but I was really afraid of Mr. O'Donovan's servant. This man was a Persian, who made it a business to travel about with Englishmen new to the country, in which capacity he had served many, and he even spoke a little English. I had no cause, however, to fear this man's penetration, for one day he came to my servant and said, "How is it that your master knows the price of things in Persia so well; he has told my master and now I cannot make any profit out of him. I hear there is an English colonel coming from Ispahan to Mash-had, I shall go and serve him." The English colonel was myself. This man, who was afterwards in Captain Gill's service, told him he never suspected me.

Every one at Lutfabad held himself ready to turn out at a moment's notice in case one of the villages on the frontier close to Lutfabad should be attacked by the 6000 Turkomans. The Begler Begi declared he had 500 cavalry, although I thought myself he had not more than 400. But he was very anxious, and my private opinion was that if anything like 6000 Turkomans had appeared his cavalry would have made a strategic movement—and a pretty rapid one too—to the rear. In view of such an eventuality I was mounted on the best horse I had, a large grey Turkoman which I had purchased.

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* While this is passing through the press, telegraphic news has been received of Mr. O'Donovan's release and return to Mash-had.

During the day we had horse races just outside the town. Our fighting powers, however, were not put to the test, for on the second day we heard that the Turkomans had marched on to Geok Tepe, keeping just outside the Persian border. The Begler Begi was quite radiant, and I saw that a great weight had been lifted off his mind.

Though I had met and conversed with plenty of Turkomans both in Mahomadabad and Lutfabad, where there are numbers, I had never yet entered a real Turkoman village. The Begler Begi suggested that we should visit some of the villages within his border inhabited by Turkomans. We started the next morning. It was a fine day, and everybody seemed relieved by the impending attack from the Turkomans having been avoided. The whole plain was covered with high mounds, each one the remains of a fort or village, many of them crowned with ruins. Only a few of these places are now inhabited. The population of most of them have been carried into slavery or slain; as the escort of the Begler Begi said, "Every foot of this country is stained with blood." On the road we passed a piece of swampy ground where two years before the Begler Begi had attacked with 700 cavalry a party of 800 Turkomans led by his own cousin, Dowlut Murad Khan. The Turkomans after some fighting had fled, and in their flight had got into a swampy piece of ground, from which they were not able to extricate their horses; 250 were killed and 53 taken prisoners. The heads of the slain were skinned and the skins sent to the Shah, who pays a reward of five tomans (a little under 2*l.*) for the head of each Turkoman killed raiding within his frontier. The prisoners were ransomed for various sums—from 30 tomans or 11*l.* up to 100 tomans or 37*l.* I saw a few who were too poor to ransom themselves still in prison at Mahomadabad.

The largest and most conspicuous mound was called Khusru Purwez, and the town which formerly existed here was said to have been built by Khusru Purwez, who was king of Persia in A.D. 591. There were houses on it still, but I was told by the Begler Begi that these were quite modern, built within his own recollection. The place is deserted, as are so many others in the neighbourhood. It would be most interesting to dig here, but great difficulties would have to be overcome before that could be done, as there would be grave risk of capture by Turkomans if labourers remained at night, and the Persian Government is very jealous of all excavations.

A very large population must have formerly inhabited this rich plain, which is well watered and only requires peace to become most flourishing again.

The Begler Begi, finding it impossible for a Kurd or Turk population to exist in these frontier villages, has persuaded a number of Tekke and other Turkomans to occupy the deserted villages along the border, and it was to some of these we were now bound. As we rode along we put up many pheasants from the thorny scrub we were passing through. I do not know the botanical name of the bushes, but the plant is called *jowassa* in India. One of the pheasants was pursued by three or four of our escort, and after the third flight allowed itself to be taken by hand. It was just like an ordinary English pheasant, but had a little white on the wings. The Governor told me that sometimes as many as 100 are captured in a day in this way.

We first visited the Turkoman village of Hissar, and then proceeded to Makdum, 11 miles farther, also a Turkoman village, where we halted to lunch.

The Turkomans, who never repair any buildings, were living among the ruins of the houses, some in regular alajaks made of felt, others in tents made of mats. I went into the tents; the women were dressed just like the Turk women of this part of the world, except that they did not wear a veil. They had a profusion of silver coins hanging round their necks. A very handsome carpet was spread for me, and I was begged to repose.

The tents are well worthy of description. They are composed of a framework of poles all round, with rods running to a central piece of wood like a cart-wheel. This central hole is intended for the escape of the smoke. The framework, which is easily taken to pieces, is covered with thick felts, a special piece being drawn over the opening at the top when it rains or snows. The fire burns in the middle of the floor; ropes pass over the tent and fasten it down to the ground. Outside, a strong piece of matting or a reed screen, known in India as a *chick*, is bound round as high as the walls to give stability to the whole. Those who have lived much in tents, as I have done, must remember what an inconvenience the pole in the centre of a tent is. In this kind of tent there is no pole in the centre; and all ridge poles, which are constantly breaking in ordinary tents, are also avoided.*

After spending a short time in the tents, I went and joined the Governor, who asked me to lunch. The meal consisted of pilaf of rice and boiled mutton. I wanted to go on towards Abiverd, but the Begler Begi declared we could not, as he was still afraid of Turkomans, and that we must get back to Lutfabad before sunset. Abiverd was nine miles off, and I took the bearings of it, also of the hill on which Kalat-i-Nadiri was situated, 42 miles off.

Close to Makdum is the Turkoman village of Kussowlie. We returned by another road, passing the Turkoman village of Mehni, not a Tekke village but inhabited by Turkomans from near Khiva; then through the rich land of the poor little village of Chilian. Here there were fine trees and gardens, although the village was most miserable. The poor people, who are not Turkomans, hardly dare move about for fear of capture, as Chilian is one of the most exposed places. We got back to Lutfabad before sunset.

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* Two models of these tents, made on the scale of one inch to a foot, were exhibited by Colonel Stewart.

Some Alhehli Turkomans have settled near Abiverd, and I saw a chief man of theirs who came to meet the Begler Begi, mounted on one of the best Turkoman horses I have seen.

Before leaving this place, I must say a few words about these horses. During the time that I resided in Daragez I examined several hundred Turkoman horses in my character as horse-dealer, as the Begler Begi permitted me to look over all his cavalry horses with a view to purchase. On various excuses, I purchased as few as I could, but was obliged to buy some to sustain my character.

These horses are not prepossessing at first sight; they are decidedly leggy, long in the back and long in the neck, but they improve on further acquaintance; and when the wonderful feats of endurance they can perform are seen one learns their true value. Most grossly exaggerated statements of the feats performed by Turkoman horses, however, are current.

I do not consider them fast; their best pace is a quick walk; they also have a long, cantering pace; they never trot. I have heard of their accomplishing the distance from Kala Kaushid Khan to Mash-had, about 200 miles, in three days, carrying all that the rider and horse required as food on the way; also from Kala Kaushid Khan to Khiva, 360 miles, in six days, doing the same. I have heard of a Turkoman horse covering about 100 miles in 24 hours, carrying his rider, body-clothing, &c. I believe a really good horse will do 60 miles a day for several days together, eating very little food; but anything beyond this is pure fiction. There are no milestones in the desert, and all Orientals are prone to exaggeration.

If I was asked to point out a distinguishing feature of the Turkoman breed of horses, I should say their greatest peculiarity was their hairlessness. They have naturally very little mane, and what they have is always carefully cut off. Their tails are generally scanty. The skin is very soft and thin, and the hair on it very fine indeed. If a patch of hair is rubbed off it only grows again very slowly, and if rubbed off more than once it often does not grow again at all. Bare, hairless patches are common, especially behind the saddle where saddle-bags are usually carried. They are never stabled, but picketed out in the open. The greatest care is taken of them, and they are well clothed. First a thick felt body-covering is put on, of the size an English horse wears; over this an immense piece of felt is fastened, covering the horse's ears and his whole body down to his hocks. This clothing is secured with a long roller, which is passed three times round the body.

However little clothing a Turkoman may take for himself, he always takes the full clothing for his horse; generally for himself he takes nothing but a long sheepskin coat, called a *poshtin*, and he will sleep even in snow with nothing but this. Certainly, Turkomans are a very hardy race, and when on their *alamans*, or raids, manage with wonderfully little clothing. Their horses, when in their *oubahs*, or camps, are fed on barley and chopped straw. On a foray they have nothing but the bushes or sometimes rough grass, which they can pick up; but some grain is always given them once a day. I made inquiries as to the barley-meal and sheep's-tail-fat balls which the Turkomans are said to give their horses. The people I saw were not accustomed to give their horses this mixture, but flour and sheep's-tail-fat, or clarified butter, are given all over the East to horses when required to support great exertion; so there would be nothing extraordinary in a Turkoman occasionally giving it. I myself, in India, have often given my horses a pound each of flour and coarse sugar and half a pound of clarified butter made into balls, when I have ridden them far and wanted them to go on again. This is, I believe, easily digested by the horse, and he is ready to start sooner than if a feed of corn is given him, and it is supposed to give great strength. The Turkoman horses are sometimes given an opium pill when they are required to make a great effort.

Turkomans give their horses almost anything they eat themselves. A Turkoman horse belonging to the Governor of Daragez, he assured me, would eat the boiled rice of a pilaf. This is rice over which melted butter has been poured. Though hardy in respect of food, the horses require a good deal of care as to clothing; their very fine coats and fine skins, when at all well bred, predisposing them to catch cold during the winter season.

The Turkomans, as a race, are very impatient of control, and have no regular chiefs for internal affairs, but in times of war and for external affairs they have chiefs who exercise a certain amount of power. In the Akhal Tekke country during the war almost despotic power was exercised by Mukdum Kuli Khan, he having even cut off the hands of people who disobeyed his orders.

All Tekke Turkomans, whether of the Akhal or Merv country, are divided into four clans, known as Wakil and Beg, Suchmuz and Bukshi. Tekke means wild goat. The word Tekke also is applied to the old he-goat that leads a flock of goats. The Wakil and Beg clans are collectively called Toctamish, as they are descended from a person of that name. The Suchmuz and Bukshi clans are collectively called Otamish, as their ancestor bore that name. In the Merv country the Wakil and Beg clans live on the eastern side of the Murghab; the Suchmuz and Bukshi on the western side. The Wakil and Beg are the two most powerful clans. The Wakils have the first right to the water from the Murghab. Their canal, or branch, of the Murghab from the dam at

Benti must be filled first. Each clan is divided into many families, and these families have each a person called a *khetkhoda* who acts for the family in matters of policy, but he can only act according to the wishes of the clan. I do not know the exact number of khetkhodas in the Merv country. I believe there are 24, but there may be more.

In some of the clans one family has rendered itself more powerful than the others. In the Beg clan the family of Kaushid Khan, who persuaded the Turkomans to unite to build the fort, have most power, and its chief representative is now Baba Khan, a son of Kaushid Khan. In the Wakil clan the family of Noor Verdi have rendered themselves most powerful; and while one son of his, Mahomad Yusuf Khan, is the most important person of the Wakil clan, in the Merv country his other son, Mukdum Kuli Khan, was the chief of the Akhal Tekke. In the Suchmuz and Bukshi clans there are several men of great influence, still no families have attained to such power as the families of Kaushid Khan and Noor Verdi Khan have in the other divisions. In times of danger the khetkhodas elect some person, who by family influence and determination of will obtains paramount power for a time, but Turkomans are too independent and free to allow him to retain it when the danger is past. Mukdum Kuli Khan, the chief of the Akhal Tekke tribe, was an instance of this supreme power being invested in an individual for a time.

At two long days' march from Kala Kaushid Khan is situated a settlement of the Salor Turkomans, called Yulutan, where there are some 4000 tents of that tribe, and a very imperfect dam over the Murghab; and five marches further up the Murghab, beyond the junction of the Kushk stream, is situated within the Afghan territory the chief settlement of the Saruk tribe, called Panj Deh, consisting of some 7000 tents.

The Saruk would act with the Tekke in any external affairs, but are not very friendly in ordinary times, as they have been ousted from some of their best lands by the Tekke. For some years there has been peace between these tribes.

I will now give a short description of the roads from Persia to the Merv country.

There are many roads. Firstly, the most northern road from Lutfabad to Kala Kaushid Khan, viâ Chungul, which is usually done by camels in eight days, but I have known a laden caravan of camels arrive even at Mahomadabad in six days; a second road goes by Mehna, in the Kalat-i-Nadiri district; a third by Kara Chacha, in the same district; a fourth is from Mash-had, viâ Sarakhs, to Kala Kaushid Khan, ten marches for laden camels.

All these roads are traversed by caravans, but are difficult, and from the Tejend river to where the first canal from the Murghab is reached, a space of some 85 miles has to be passed over, either without water at all, or on some of the roads there are wells of brackish water at about

66 miles after passing the Tejend. The only easy road to the Merv country, without constructing a canal, is from Herat and up the Kushk stream to its junction with the Murghab. In former days, Herat as well as Merv belonged to Persia, and this road was much used. Also in former days canals from the Tejend near Sarakhs ran out a long way into the desert and made the journey by Sarakhs a comparatively easy one, which it certainly is not now. There are still water reservoirs and caravanserais in ruins on this road, showing where the old road to Merv ran.

A canal which formerly existed, and which led from the Tejend river near Sarakhs to Kacha Kum, could easily be reconstructed. Kacha Kum is a halting place for caravans, and has several wells of brackish water. A canal can still be traced from the Tejend to this place, and in 1860 Hamza Mirza Hashmat-ud-Dowlah, the Persian general, employed his army for a few days in damming up the Tejend and turning it into the bed of the old canal. His efforts were successful, and the water ran for many miles in the bed of the old canal and supplied his army for several days. The water did not reach so far as it formerly did, but only to a place called Kurk Tepe, or the Wolf's Mound; still this was an immense assistance. A little more time and a little more engineering skill would no doubt have sent the water as far as it formerly went, to Kacha Kum, from whence it is only about 20 miles across the desert to the first canal from the Murghab.

I returned to Mahomadabad on the 2nd of January by a different road from that by which I came to Lutfabad, and on the 14th of January left Mahomadabad on my return journey to Mash-had. I never crossed the Persian border from Daragez, and only adopted an Asiatic dress that I might move about unrestrained and mix with the people freely. I returned by Nishabur, Subzawar, Teheran, and the Caspian Sea to England, which I reached on the 24th of April, passing Baku on my Caspian route.

Baku, which I remembered as quite a small place, has now more than 30,000 inhabitants, and it has, I believe, a great future before it. The unlimited supply of petroleum, which is here found, is a mine of wealth. As soon as railways are made I believe that Baku will supply the world with petroleum. The price is now only a halfpenny per pood of 36 lbs. on the spot, and the supply is practically unlimited. All the steamers on the Caspian already use it as fuel instead of coal, and I believe the use of petroleum as fuel will soon be extended to the railways also. Some locomotive engines already burn petroleum.

In introducing the author of the paper, the PRESIDENT said the journey described was not the first visit that Colonel Stewart had paid to those regions; but he had now the advantage of bringing home information regarding a country which at this moment was of very great interest. It was sometimes said that almost the only benefit war conferred upon the British tax-payer was that it enlarged his knowledge of geography; and doubtless, during the last year or two, while the Tekke Turkomans had been engaged in opposing the gigantic power of Russia, a great deal more interest had been felt in their history and country than formerly. Of course they were an interesting people, as all were, who were struggling for independence; but at the same time they were not desirable as near neighbours, so long as they preserved their present customs. Between thirty and forty years had elapsed since any Englishman had traversed the Tekke Turkoman country.

The following discussion ensued on the termination of the paper:—

Sir Henry Rawlinson said that, in common with all geographers, he felt greatly indebted to Colonel Stewart for the additions he had made to our knowledge of the geography of Persia, and for the skill and courage he had shown in travelling in that part of Asia. He himself had never travelled among the northern mountains of Khorasan—only along the southern route; but he had studied the country very carefully and was tolerably well acquainted with both its ancient and its modern condition. "Daragez" meant "The Valley of Tamarisks," *gez* being the name of the ordinary tamarisk bush. He supposed, therefore, that that bush was common there. But Daragez or Deregez was not an ancient name, dating only about a hundred years back. Formerly, it was part of the great territory of the Parthians. The Turkomans were the descendants of the Ghúz or Komani—a race of Turks who had penetrated all the way from the East of Asia through Persia and even as far as the Danube. In fact, very recently a vocabulary of their language had been published which was compiled by Petrarch in the 14th century, and it was very good Turkish of the present day. The Turkomans were not only to be found in the desert between the Caspian and the Oxus, but remnants of the old Turkoman settlements were met with throughout Asia Minor, Syria, and Persia, and a few even were found in Afghanistan. He wished to call attention to one important fact which he had mentioned before, but which could not be too often repeated, namely, that this country of the Akhal Turkomans in ancient times was one of the richest in Asia, because the southern branch of the Oxus (*Ochus* of the Greeks) flowed through it. The bed of that river had been traced by the Russians from the modern Oxus, above Charjúí, to the wells of *Igdi*. It was also heard of by Major Napier and, he believed, by Captain Gill and Colonel Baker, who travelled in the same country. When that river was running, the whole of what was now desert formed one of the richest parts of Asia. It was the home of the Nisæan horses, which took their name from the town of Nissa, near Askabad. It was the cradle indeed of the Parthian race; for the Parthians were not mere desert warriors, but possessed a very fertile country; and it was from the strength of these resources that they were able to conquer all Persia and found the great Parthian Empire. What Colonel Stewart had mentioned about the Christians was rather curious. There were, no doubt, a great number of Christian settlements thoroughout Khorasan up to the 14th century. The Nestorian annals were full of notices of monasteries and bishoprics in that country, and no doubt the various *kílísseh*s that Colonel Stewart had alluded to were remnants of the Christian churches belonging to Nestorian congregations. Colonel Stewart had been so careful to respect the rules of the Society which excluded the discussion of politics that he had purposely omitted some circumstances which would be of great interest, and which, in discussing a geographical question like the present, could not be avoided altogether. He had mentioned that a railway had been opened from Mikhailovsk Bay towards Kizil-Arvat, which would go on to Bami, the capital; but it could not be supposed to stop at Bami. It was in reality the first section of a line which would some day join the Caspian and the Indus, meeting the English line by Candahar and Herat. He wished to ask Colonel Stewart what information he had obtained about the continuation of that line. It was easy enough along the Atock to Askabad, and then by Daragez to Sarakhs; but from Sarakhs the line would follow the river to Herat along a track which was now uninhabited. That was the natural run of the country; and as in ancient times the high road ran through that district, there could not be any physical obstacles. He might add that in former days, from Sarakhs there were two great routes leading southward, one up the Tejend to Herat, the other circling round the desert across the Murghab and then along the skirts of the hills by the ancient towns of *Talikán* and *Fáriáb* to Balkh. Along both those lines there was a series of caravanserais for travellers, and he presumed that their ruins might still be seen. The country was no doubt at present uninhabited, possessing, however, abundance of water, with tamarisk jungle and other vegetation. Any information that Colonel Stewart had picked up on the subject would be of very great value. Some ten years ago a traveller was sent by the Government of India through those countries. His report had been printed, but never published. His name was Daood Khan. Part of the routes that Colonel Stewart had alluded to were actually traversed by that man. First he went from Sarakhs to Merv, and so on to Charjúí. Then he came back to Sarakhs, made a circle in Khorasan, and returned by Kelat to Kara Chacha; from whence he crossed the Tejend, and, stopping one day in the desert, on the second day he reached Sháhidlí, and from there went on to Tash-Robat and Merv. He only spent one day in the desert, and that verified the information which Colonel Stewart had received from the people of the country. Colonel Stewart's remarks about the canal running from Sarakhs along the road towards Merv were of great interest. M. de Blocqueville, a French photographer who accompanied the Persian army when it advanced on Merv, and who was taken prisoner by the Turkomans, described the canal as having water flowing through it at that time, but he believed that at present it was perfectly dry, and there would be some difficulty in turning the water into it again, for the bed would require to be thoroughly cleaned out. Among the last blue-books presented to Parliament there was a very interesting despatch from the Russian Foreign Office that contained a remarkable phrase, in which blame was imputed to certain English officers who, it was said, were "haunting" the desert, as if that was rather a discreditable proceeding. Now, in Colonel Stewart's paper the Society could see the results of such "haunting," and he only wished that other inaccessible parts of Asia were "haunted" in the same manner. So far from its being a discreditable proceeding, it appeared to him to be deserving of the highest commendation. The greatest credit, indeed, was due to Colonel Stewart for his services not only in bringing back geographical details, but in giving the Society a general view of the present condition of the country. For his own part he must say that he had derived the greatest pleasure and much instruction from the very interesting paper which had just been read.

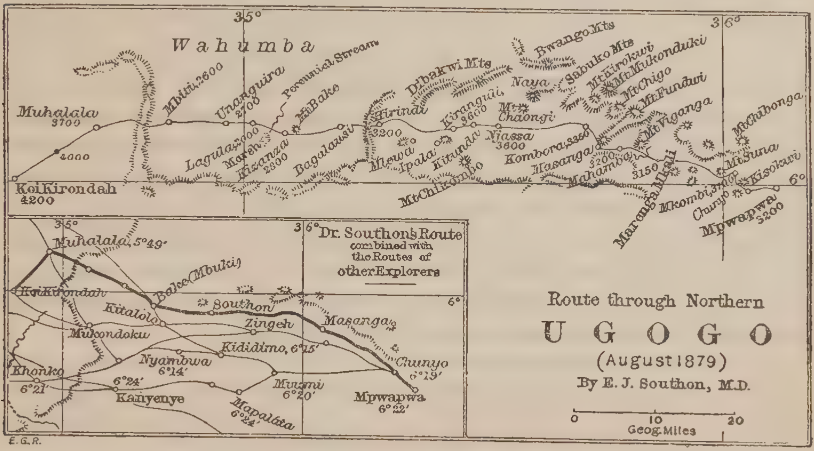
Captain Gill said the regions described in the paper had been "haunted" more or less by officers during the last ten years. In early days there were several travellers in these districts, but about twenty or thirty years ago everybody seemed to go to sleep, with regard to the whole of the country, and no one appeared to take any interest in it until awakened by Colonel Valentine Baker. It was that officer who invited him (Captain Gill) to accompany him, and that was how he first came to travel in that part of the world. They went to Mash-had and travelled throughout the whole region. It happened that last December he (Captain Gill) was on the road up from the extreme south through Persia. When he arrived at Mash-had he found an English officer there, Colonel Stewart, and they spent a few pleasant days together. It might well be asked what induced so many travellers to go into those countries and "haunt" those inhospitable deserts. Of course the whole interest of the thing was centered in the district of Merv and its strategic and geographical position, for it could not be concealed that not only was the place interesting from its geographical position as having been the cradle of the Parthian race, but it was also interesting from its strategic position as connecting the line of Russian advance by the Oxus with that by Kizil-Arvat and North-eastern Persia. It was that which induced English travellers to go wandering about in those places. For his own part, he did not think that the Russians had any intention of travelling to Merv at present. If they pushed on their railway, their line of advance was by Sarakhs or Mash-had direct to Herat. Still, the importance of Merv as a strategic point must not be overlooked. With regard to the Turkomans and the Persians, no one could doubt that the Russians had done a great deal for the Persians in freeing them from the scourge of the Turkomans; no one could question that the Turkomans had committed great cruelties and done a great deal of injury to Persian people. He had been very much struck by the condition of the watch-towers and of the village walls in the district within a hundred miles of Mash-had. These towers had no doors, but were provided with a rope ladder, and when the owners heard that the Turkomans were coming, they would climb to the top of the tower, draw up the ladder and wait till the marauders were gone away. All the villages had mud walls around them, with towers at the corners and strong gates which used always to be closed at night; but during the last few years the watch-towers had been tumbling into ruins, and the people, instead of living in their villages, were building their hovels outside, the villages themselves being often little better than a heap of ruins. Their houses were like bee-hives in shape, made of mud. The reason why the people were thus living outside the villages was that they no longer feared the raids of the Turkomans. Whatever objection might be felt to Russia advancing to India, the fact could not be denied that the Russians had done a great deal of good to those countries on the borders.

The PRESIDENT said every one present must feel the great advantage of being brought face to face with enterprising travellers who came to narrate their adventures to the Society. He wished to say one word about the exclusion of political subjects from the discussions. He was not at all in favour of such exclusion, for such questions added another subject of interest to those more immediately connected with the meetings. What, however, he wished to avoid was the intrusion of mere party politics. Those political considerations in which all were equally interested never could be excluded. From that point of view, looking at the subject which had been discussed, the conclusion he arrived at with regard to the Turkomans and their proceedings, after hearing the most interesting account given by Colonel Stewart, was that, acting upon the Christian principle of doing unto others as we would they should do unto us, the best thing he could wish for all their neighbours was that the Turkomans should be removed into a country where they would have no neighbours. They must be improved, and if it could not be done in any other way, it would be for the benefit of humanity if they were removed off the face of the earth.

Notes of a Journey through Northern Ugogo, in East Central Africa, in July and August 1879.

By E. J. Southon, m.d., u.s.a., of the London Missionary Society.

Having in our journey across East Central Africa had no instruments with which to take observations, excepting a prismatic compass and an aneroid barometer—the former lent by the Royal Geographical Society to the late Dr. Mullens—I can lay no claim to scientific accuracy in the following description of our route through Northern Ugogo; but rough as it is, I still hope that it may prove to be of some service to such travellers as may follow me through this region, which has not before been traversed by Europeans. Most of my notes, I should premise, have been copied from my journal, which was written up every day, but these have in some instances necessarily been much abridged.*



We left Mpwapwa on the morning of July 21st, 1879, after a stay of ten days, during which time we had reorganised our caravan, which now consisted of two Europeans (the Rev. W. Griffith and myself), Juma Nasibu (headman, formerly in Commander Cameron's service), eight other chiefs, and 158 porters, &c. After crossing the Mpwapwa stream, our road ran in a N.W. by W. direction to Kisokwé, at the entrance to the Chunyo Pass, where it turned abruptly to the north, over the shoulders of several hills which form the Mpwapwa basin. So far the road had been tolerably good, but now gullies, ravines, and broken ground made travelling difficult. From the top of one of the hills I took bearings of the Chunyo peaks; Chikombo, a high hill to the north-west; and a conical hill called Suna, at the foot of which was 'Mkombi, our halting-place—a collection of about thirty *tembes* lying in a small basin which is formed by low ranges of hills, with here and there a lofty conical peak rising far above its fellows. We pitched our tents under a huge baobab-tree near the centre of the plain, which was about six miles in extent. From a neighbouring hill I got a set of compass-bearings, and from a native the names of the most prominent hills. A fine stream of water flows from the foot of one of the hills east of our camp, and I was told by the natives that it afforded a good supply of water all the year round. The Wagogo here are independent and uncouth, but they do not demand a *mhongo* from passing caravans, and they readily sell what provisions they have at moderate prices. Several herds of cattle, with flocks of sheep and goats, were grazing on the scanty herbage and *matama* stalks on the plain.

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* All bearings given in these notes are magnetic, but in the map which I send the bearings are true. The latitude and longitude of Mpwapwa, which is the starting-point of a series of triangulations continued along the whole of my route, I have taken from Commander Cameron's map, and any error that there may be in his calculations will, of course, run through the whole of my map.

[The larger map given above is carefully reduced from Dr. Southon's original tracing. In the smaller map we have attempted to combine Dr. Southon's route with those of other explorers. All observed latitudes have been inserted on it. Those which most materially determine the true direction of Dr. Southon's route are: Mpwapwa 6° 22′ (Hore); Chunyo, 6° 19′ (Lieut. Shergold Smith); and Muhalala, 5° 49′ 23″ (Lieut. Shergold Smith).—Ed.]

My aneroid at Mpwapwa stood at 27 inches, which I carefully calculated, making that place 3200 feet above the sea-level. At Mkombi its reading was 27·10, which gave an altitude of 3100 feet. (Distance from Mpwapwa by pedometer, 8 miles. Time, 3½ hours.)

July 22nd.—We started at 9.30 A.M., having had to give the men time to cook, and make preparations for crossing the Marenga Mkali, which was said to be waterless.

Our course was westerly for the first few miles, and led us through a valley covered with low, thornless bushes. We then emerged upon a level plain, similar to but larger than the one on which we camped at 'Mkombi. This we crossed in a north-west direction to the foot of a range of hills which formed the western boundary of the plain. An opening in these hills allowed us to pass in a westerly direction, and soon we were winding in and out among the huge masses of granite, gneiss, and quartz which were scattered about everywhere. After gradually descending for about a mile, we came to the dry bed of a watercourse, which skirted a large plain on the east and south-east, small hills and low mountain ranges lying to the north and north-east. It was here that we expected to find water, but none was to be had, the appearance of the channel indicating that it had been dry for some time. We then pushed on for another pool, said to be four miles distant, but before we got there the sun had set, and we were obliged to camp in the open plain. Our stoppages during the march had been frequent, owing to some of the party having fever, and amounted in all to 2 hours 20 minutes. (Distance from Mkombi, 13 miles 1 furlong. Time, 6 hours.)

July 23*rd*.—We left our camp at 5 A.M., every one being anxious to get to the water, which was reached about 6.30. This pool was almost a mass of liquid mud, but by dint of straining and filtering some fairly good water was obtained. We saw elephants, giraffes, and buffaloes in considerable numbers, and I should therefore think that an abundant supply of water must exist somewhere on the plain or in the adjoining valleys. The road now ran to the north-west, through very thick, thorny bushes and low undergrowth, but eventually we emerged into the dry bed of a very considerable river, which in the rainy season must send a large body of water to the south-west. After leaving the river-bed, the plain became more open, and we made good progress during the remainder of the march, which was chiefly in a north-west direction. We arrived at Mahamba at 11.30 A.M., having rested about an hour and a half on the way. (Distance from last camp, 8 miles 3 furlongs. Time, 5 hours.)

There are about a dozen *tembes* at Mahamba, some of which were very large, and contained great numbers of people, who eagerly ran out to see us. Water is only procurable by digging, but several large holes yielded a plentiful supply. A small *mhongo* of eleven cloths was paid to the chief, an old man whose name, I believe, was Mtongo Mkama. This custom of taking tribute from passing caravans was originally a kind of water-tax, and simply intended to pay for the trouble of keeping the water-holes in repair.

July 25*th*.—A march of three miles to the west, over a dry and dusty plain, brought us to Masanga, the next *mhongo* place, where we had to stay the day owing to the absence of the chief, without whom no business could be transacted. There are about twenty-five *tembes* in Masanga proper, but seven or eight more lie a few miles to the west, and make up the district known as Kombora. Only one chief, however, rules over the two places, which are sometimes known and spoken of as Great Masanga and Little Masanga. Our *mhongo* for both places was eight cloths.

Several large masses of gneiss and granite in the neighbourhood of our camp I recognised as those which I had seen from the place where I took bearings at Mahamba, and from the top of one of these I got a good set of angles, which enabled me to map out the hills and mountain ranges for a considerable distance. A glance at the map will enable any one to form a better idea of these than could be gained from any verbal description.

July 26*th*.—After a march of 4½ miles N.N.W., over a gently undulating country, we reached Kombora, where we camped under an immense baobab-tree, at the edge of the village plantations. The soil here was somewhat different to that observed at Masanga, being largely composed of red sand and small stones in the place of black loam. The aneroid reading gave 3350 feet altitude.

July 28*th*.—From Kombora we made a W.N.W. course for several miles across an open plain studded with clumps of mimosas and other tall trees. A small pool of water was passed at 8½ miles, but otherwise the plain seemed waterless. Five miles further west we came to Njassa, a collection of about thirty *tembes*, situated in a small hollow on the western side of a plain which had a very perceptible slope towards the south. We settled the *mhongo* here by paying seven cloths, and received a present of fowls and other food from the chief. The aneroid gave the height of this place as 3600 feet. (Distance from Kombora, 13 miles 4 furlongs. Time, 5 hours 30 minutes.)

July 30th.—Four miles' travelling through sparsely wooded forest and over broken ground brought us to the village of Kitunda, which bears about west by north from Njassa. About 20 *tembes*, very much scattered, were here built in various situations, mostly on the sides of small hills which stud the surface of the plain. We paid as *mhongo* nine cloths. From a neighbouring hill I got bearings of two large towns to the west and W.S.W., both of which, being situated at the foot of hills, could be correctly pointed out.

July 31st.—Leaving Kitunda at 6 A.M. we had a good road over a level plain to Kiranguli, a village of nine *tembes*, four miles to the west of Kitunda. As we expected to make a long day's march, we here allowed the men to cook their food and have a good rest, so that it was 10.30 A.M. before we were again on the road. From Kiranguli our route lay through endless woods and thick thorny bush, through much of which we had to cut our way, the pathway being very much overgrown with vegetation, and but little used. A large pool of intensely nauseous water was passed at 12.30 P.M., and a few open spaces gladdened our eyes now and then. About 1 P.M. we seemed to be descending slightly, and this impression was confirmed on looking at the aneroid. At 6 P.M. we arrived at Hirindi, having been nine hours on the road, not including rests. Our road during the latter half of the journey had been nearly north-west, and mostly through heavily timbered forest. The aneroid gave an elevation of 3200 feet. Hirindi lies in a hollow, which has a trend southwards, the western edge of the basin being a sharp ridge of gneiss and granite, mostly covered with soil, and clothed with trees. There were only seven *tembes* in this place, where our *mhongo* was settled by paying six cloths. (Distance from Kitunda, 18 miles 4 furlongs.)

August 1st.—The same kind of dense forest, but with more open pathways, was passed through on our way to the next village, Bagalausi, seven miles west of Hirindi. After resting an hour here we resumed our journey, and passed a large number of palms (? *Hyphæne*), the fruit of which hung in immense clusters like huge bunches of grapes, purple in colour, and enclosing a dry stringy substance, slightly sweet, which the Wagogo chewed as food.

From Bagalausi our course was west by north through dense forest, alternating with an occasional open space. The descent here was very perceptible, and had a trend to the south-west. Thirteen miles from Hirindi we came to the outskirts of Kizanza, a very populous district, governed by a single chief. Here the palms grew in great numbers, being almost the only tree of any size which the Wagogo allowed to grow in their plantations. Three miles further, through matama fields and over a plain covered with low bushes, brought us to camp, near the chief's *tembe.* (Distance from Hirindi, 16 miles 5 furlongs. Height above sea-level, 2850 feet.)

I got sets of bearings from a small isolated hill in the midst of the plain, and learnt from the natives that Mizanza bore S.S.W., Mukonduku south-west, and Pembera Pera due south, distant two days' journey of eight hours each. From this hill I perceived that the plain extended northwards without any break upon the horizon, but to the south was a range of hills about 15 miles distant. The forest we had come through bounded the horizon on the east, but to the west a lofty chain of mountains appeared, about 25 miles distant; the range to the south ran east and west, while that on the west ran north and south, the two ranges meeting at the south-west portion of the plain. Our *mhongo* was settled by the payment of fourteen cloths. The aneroid gave the height of the hill as 480 feet above the level of the plain.

August 5*th.*—To-day we travelled over the dry and dusty plain to Lagula, distant from Kizanza six miles north-west, and on our way passed a fine stream of water, 19 feet wide, which flows into a marsh to the south of the road. Lagula consisted of about forty *tembes*, some of them being 500 feet square. We paid a *mhongo* of eight cloths to the chief, who was under the jovial influence of *pombe.* Our aneroid here gave 2900 feet above sea-level.

August 7*th.*—A march of 3½ miles west by north from Lagula brought us to Unanguira, the last *mhongo* place on the road, where we had to give nine cloths and two coils of wire to the chief, who claims the title of the "Sultan of all Ugogo." Great numbers of *tembes* lie closely together, and extend in a northerly direction for several miles, the inhabitants of which make up the most populous district on the whole route. (Height above sea-level, 2700 feet.)

August 10*th.*—From Unanguira to Mbiti, our next camp, the distance was 8 miles 2 furlongs west by north. Here we saw large numbers of the Wahumba, a fine race of people, living to the north. The aneroid at Mbiti registered 2600 feet, the lowest altitude observed on the whole route. About a dozen *tembes* gave habitation to the people of this place, who are subjects of the chief of Unanguira.

August 11*th.*—Close to Mbiti the road winds up the side of the range of mountains which seems to constitute a natural boundary to Ugogo, though several villages on this range are tributary to the chief of

Unanguira. After half an hour's climbing, we came to what may be termed the first step of this range, the aneroid there giving an altitude of 800 feet above the plain below. We traversed in a westerly direction, the elevated and well-wooded plateau, on which several small villages were passed, and eight miles from Mbiti we began to ascend the second step of the plateau, but the ascent was more gradual than before. This second step was 350 feet above the first, and 1150 feet above the plain on which Mbiti stands.

Muhalala, 11 miles west from Mbiti, was reached at 11.30 A.M., and the aneroid there gave an elevation of 3700 feet above sea-level. This place is simply a collection of huts, *tembes*, and *bandas*, in which live numbers of Wagogo, Wangwema, Wahumba, and Wanyamwezi, all apparently the offscourings of the countries around, and possibly engaged in some nefarious business. They demanded *mhongo*, but, as it was not customary to pay it at this place, we declined to give it; they, however, stole a load of cloth from some Wanyamwezi who were travelling under our protection, thus justifying the opinion I had formed of them.

August 13th.—From Muhalala we went in a W.S.W. direction, camping on the open plain near the end of a river, where a few pools of water yet remained. The road lay through forest and over rocky undulations, where huge piles of granite, gneiss, and trap rocks were often seen, piled in the wildest confusion. (Distance from Muhalala, 8 miles 2 furlongs. Altitude above sea-level, 4000 feet.)

August 14th.—Keeping the same direction from Muhalala, after a march of 8½ miles we arrived at Koi Kironda, where the main and south roads through Ugogo meet and form the chief highway to Unyamwezi. As this place and the road which we afterwards took have been frequently described by former travellers, it is unnecessary for me to attempt to add our experiences to the good descriptions some of my predecessors have given of the route beyond. I desire, however, to state, in conclusion, that everywhere in Ugogo we were treated with the greatest respect and deference, and, as at most of the places we visited no Europeans had ever before been seen, we were the objects of the liveliest curiosity on the part of the people; but though we permitted them to have free access to our tents and camp, we never witnessed anything in the shape of pilfering or quarrelling, nor was there any attempt at extortion such as is commonly reported to occur in other parts of Ugogo.

It is worthy of notice that the amount of *mhongo* paid on this route is about one-fifth of what travellers have recently been compelled to pay on the more southern roads. I mention this, because it seems to me very important that travellers should discontinue, if possible, to traverse the old roads on which the "insolent Wagogo" exercise a tyranny so harsh and complete that such routes are greatly dreaded by those who must pass through Ugogo. If, therefore, my attempt to make known this new route should save any future traveller a small amount of cloth and a large amount of annoyance and discomfort, I shall be amply repaid for the trouble of writing this paper.

The Recent Journey of Messrs. Crudgington and Bentley to Stanley Pool, on the Congo.

In our June number a brief reference* was made to the important journey performed early in the present year by Mr. Henry E. Crudgington and Mr. W. Holman Bentley, of the Baptist Missionary Society's Congo Expedition, along the north bank of the river Congo to Stanley Pool, but our information at that time was only obtained from a brief and hurried letter of the former traveller. Now, however, that we have before us the journals and diaries of both, we are able to form a better idea of the difficulties they encountered and of the general features of their journey.

The party, consisting of Mr. Crudgington, Mr. Bentley, and twenty Kroo boys and Congo men, started from Mussuca † on the south bank of the Lower Congo on the 17th of January last, and travelling by canoe to Wanga Wanga, proceeded thence overland to Matadi, from which point canoes cross to Vivi on the north bank. Mr. Stanley's road here is very broad, and to reach the top of the hill there are only two rather sharp ascents. The road from the small town of Sombo, above Vivi, is over fine, open country, part of which is flat table-land; indeed all the ridges here are of about the same elevation, and the intervening valleys and ravines are clearly the result of erosion. These valleys are now thickly wooded in some parts, and being uninhabited, abound with buffalo, antelopes, leopards, and, in many places, elephants. After following the road for a long distance the party found that it led to the river, where Mr. Stanley had taken to his boats to avoid difficult hills; they, however, followed the mule path, which led through the town of Salika Banza to Mbundi, where the road began again. A broad river was here crossed, and Mr. Stanley's road then followed through a fine valley between steep hills, which is thought to have been an old bed of the Congo. At Mpambu a Ngulu Mr. Stanley has again availed himself of a smooth stretch of water, and some rough hills, as well as the river Lu-lu, had to be crossed, till the road was again struck on the top of a high hill. The heavy rains and the rise of the river had blocked the road with fallen trees, &c., and a path was found with some difficulty. Suddenly, however, Mr. Crudgington says, they came round a corner, which seemed to go straight down to the river, and found themselves on a fine built-up road on the banks of the Congo, just above the Nsongo Yellala Falls. The scenery here was very imposing; on the right roared the falls, tumbling and foaming madly over huge rocks in the bed of the river, while on the left rose the lofty and almost perpendicular Ngoma mountain, of which Mr. Stanley had had to blast and throw over huge masses, in order to be able to carry his road above the highest flood level. In front was a fine undulating route through the wood, which afforded a welcome shade from the scorching rays of the sun, the road afterwards leading over hills and valleys to Isangila Falls. These falls present a very grand appearance; the river assumes the usual deceptive, oily-looking appearance just above the falls, of which there are two; it there widens out into cataracts of about two or three square miles, where there are large rocky islands covered with trees, other rocks being kept bare by the continual rush of the water breaking over them. The whole river is a line of huge waves and breakers in which no boat could live.

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* See *ante*, p. 362.

† *Vide* Rev. Mr. Comber's map, 'Proceedings,' *ante*, p. 64.

On leaving the camp, the party struck over the hills to a neighbouring town to obtain a guide, and were led for many miles to the north, away from the Congo. They crossed the Ntombi river, flowing through a deep gorge; Yanga, a quiet town, was then reached, and a succession of cone-shaped hills afterwards crossed, the path invariably passing over the apex. The night was passed at Tionzo, and the next evening Banza Ntombo (1550 feet *) was reached, where a different tribe of people was found, but the chief proved friendly, and provided a guide. The next day a tedious march ended with the ascent of an almost perpendicular hill, 500 feet high, to a town on the summit called Kinkuka, or Banza Mpangu (2100 feet). The party thought they were now on a very high plateau, but soon after starting again found themselves on a high ridge rising from the lower level. After a troublesome descent they reached a town at the bottom of the hill, and finding that their guides were deceiving and taking them in an evidently wrong direction, they left them and struck to the eastward, crossing the Luheka river to a small town, from which their course was very direct and satisfactory, though they still looked in vain for the Congo. After a good march they came to a broad and swift river, the Luala, on the further side of which was a town named Banza Sundi. They crossed the river by a somewhat dangerous native bridge, after they had steadied it by means of stays, made of creepers. A little way beyond Sundi they came to a very rapid river, an affluent of the Luala, which is usually fordable, but owing to heavy rains during the previous night, they had now some trouble in crossing. Guides had offered themselves at Banza Sundi to show them the way to the river, but, as usual with guides, they hoped to return, after going a short distance and getting

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* The observations for altitude were in all cases made by a pocket aneroid barometer.

payment; Mr. Crudgington and his companion, however, were very firm, and insisted upon the completion of the contract. After marching some distance, they found that the path led to a long valley between high hills; they descended into it, and found themselves in a thickly populated district, with a cluster of towns extending for at least three miles. The country seemed rich in native food, such as bananas, plantains, maize, zinguva, and manioc, with a fair supply of goats, fowls, &c. The people were noisy and excited—the women especially so—as they had never seen white men before. Here the singular custom was first observed of piercing and passing a thin piece of wood, a straw, or the tooth of an animal through the nose, which gives the wearer a hideous appearance, especially when the eyes are daubed with white paint.

At this point, after the long detour into which they had been led, partly through the treachery of their guides, the travellers again approached the Congo at a rather large town named Nkasa, near Kibonda, marked on Mr. Stanley's map in lat. 5° 1′, long. 14° 40′. They were now in the country of the Basundi, and before quitting it had reason to feel the truth of every word Mr. Stanley has said of these people, who are the most wretched, quarrelsome, and suspicious tribe met with between the coast and Stanley Pool. They found a tolerably quiet town, named Kinguva, where they rested a day, and on starting again ascended the hills, intending to pass through the town on the summit, but, being warned off, they took another road, and found themselves in the midst of some very large towns. Proceeding onward, they crossed the river Luoji, and found themselves among people of a better sort, quiet, rather timid, and of stronger build, who do not wear the button appendage which the Basundi have on their hair, and take more pains with the arrangement of their scanty dress. Kibindika, a Basundi town, was next passed, on a high hill overlooking a magnificent stretch of the Congo which, being shut in by hills, had almost the appearance of a large lake. The women of the town were without exception the ugliest met with on the journey—having round, flat faces, with very broad noses and large, thick lips; and the ugliness of their appearance was heightened, if possible, by their smearing themselves over with a sooty mixture. Their hair is carefully preserved until it is long enough to be fastened up and covered with a similar mixture, so that the head has a mop-like appearance, and over the face and hair an oily mixture is poured. The ears, as usual, are pierced, and if no rings or beads are to be had, a bundle of rags three or four inches long, sometimes containing medicine, helps to finish the adornment of the person. Cloth is common in these towns, though the Basundi drive all the up-country trade across the river to the south side, where it finds its way through Kinsuka and Palabala to Mussuca and Boma.

Up to this time Messrs. Crudgington and Bentley had been very uncertain as to their correct position, as names of places had been given them which led them to think that they were much higher up the river than was actually the case. A short march from Kibindika, however, soon decided this point, as they came upon the river Mata at its confluence with the Congo. They were now on the frontier of the Babwende country, and soon experienced a good deal of trouble from the people announcing their approach from hill to hill by shouting and beating their war-drums, which worked the inhabitants up into a state of fear and excitement.

On February 1st the party slept at Mbu (which is to be occupied by the Mission as an intermediate station), and obtained guides who promised to take them the next day to Manyanga. These guides were here most necessary to them, as they had reached an open country with a hard, sandy-clay soil, and a most bewildering network of paths running in all directions. They were now very anxious to see this noted *kitanda* or market, Manyanga, to which people were said to flock from all quarters, but on reaching it they appear to have been disappointed, as it was not so large as they had expected. The next day they were able to confirm the position of Manyanga by that of Banza Ntomba and the Ngombi Falls. The hills in this district are described as consisting of a soft mixture of mud and clay, with granite cropping out near the river. Among these hills gorges have been formed by erosion, some 200 or 300 feet in depth, which have a beautiful appearance from the large trees, shrubs, and ferns growing in them. In many places the narrow path passes close by the edge of the gorges, and it requires a steady head and a sure foot to keep the traveller from falling over. The hills are very lofty, and the views obtained of the river showed that the country on the opposite side was correspondingly high, and apparently of granite formation. The next town visited was Zinga, close to the Congo, but the river could not be reached, as the hills ended in an abrupt, steep cliff, running sheer down to the water; the opposite bank was of a similar character, and in between could be heard the rushing waters of the Congo. On the next day the party came upon a broad river, which flowed with a rapid steam over a bed of sand, stone, and large boulders, called by Mr. Stanley the Edwin Arnold river, but known to the natives as the Luvubi. Following its course, they reached a point where it rushes furiously over huge boulders, falling from an immense height into the Bolobolo Pool (called Pocock Basin by Mr. Stanley), which is formed by an indentation in the cliffs on the bank of the Congo. Even in the dry season, the sight was a very grand one, and during the rains, when the volume of the Luvubi is much increased, the fall is, no doubt, a magnificent one. In front of the pool are the treacherous falls of Zinga, and, behind, the roaring Masassa.

After passing Kinianga, just above the Inkisi Falls, the party lost their way, but after retracing their steps for a time, regained the road, and crossed the frontier of the Bateke country, passing through a fence of sticks, which was possibly meant to mark the boundary. Soon afterwards they came upon a very broad and swift tributary, the Mfulukado, which is identical with the Nkenke, the latter name being given to the river at the point where it plunges into the Congo. Above the spot where the missionary party crossed, the river appeared to consist of two branches, the waters of which at the confluence plunging over masses of rock, amidst beautiful scenery, united into one broad stream. The natives, however, say that there is but one river, which is there divided by a large rocky island in mid-stream. At the landing place on the opposite side the river Evula enters the Mfulukado or Nkenke, after a beautiful, clear fall over rocks. This is stated to be an entirely distinct river, flowing down from the high land. From the hills above the Nkenke, a fine view was obtained of a very picturesque reach of the Congo towards Umvilingya. The river flows between lofty hills, which run down to the water's edge, and the valleys between them are filled with trees of every tint of green and brown, interspersed here and there with the rich blossoms of luxuriant tropical plants. The surface of the water is broken in different parts by numerous tree-covered islands of various sizes, which add to the beauty of the scene. From this point the country seems to undergo an entire change; the soil is of fine white sand, and the grass-land gives place to immense tracts of forest country. The trees are of great size, and giant creepers hang in festoons from their branches, often stretching across the path.

The houses in the Bateke country were built in a different manner from those hitherto seen. Instead of a sharply slanting roof with eaves, they had rounded roofs springing from the side walls; they were thatched with grass, with the seed-stem forming the outer layer, which gave them the appearance of being covered with fir.

On arriving at Nkio Buminu, where they were well received, the travellers were told that next day they could reach Mfwa, which is opposite to Ntamo, at Stanley Pool. Their anxiety was now greater than ever, lest at the last moment they should be turned back and not accomplish their object. They started very early the next day, and passed a great number of people going to a *kitanda* (market), without attracting very much attention. They were now travelling through fine woodland country, intersected by sandy streams, and with some beautiful open spaces covered with short grass. At one of these, situated on a small hill, Mr. Crudgington caught sight of a wide stretch of water on the horizon, which appeared like a long streak of cloud; he at once exclaimed to his companion that Stanley Pool was now in sight. They thought at first that they must be mistaken, but another view a little farther on assured them that they were right. On the way they stopped in a town to rest, and the chief, a very clean and well-dressed man, came at once and sat down in a house some 30 yards distant; he then sent them mats, and the messengers advanced, and kneeling held out the palms of their hands for them to touch, but their language was almost unintelligible. A present of fowls was also sent, and guides to point out the road. The next town was a large one, and the chief's name was given as Bwa-bwa Njali. When told of the missionaries' arrival, he at once went to them with some little attempt at ceremony. The custom of greeting was here a little different from that just described. The chief sat down in front of his visitors, and clapped his hands, waiting for them to do the same; palm wine was then produced, and after drinking himself to assure them that it was not poisoned, the chief passed the jug to them. Bwa-bwa Njali is described as a very gentlemanly person, of good physique, and remarkable for his clear skin and the cleanliness of his dress; his manner, too, was considerate, and his questions were put in a delicate way. He said that Mfwa was close to his town, but that as there was a wide river to cross, they had better sleep where they were, and he would ferry them over in the morning. The river in question is what Mr. Stanley named the Gordon Bennett, but its native name is the Zue—a beautiful, rapid stream, about 100 yards broad, with wooded banks. The next morning the chief sent two men with the travellers to Ibiu, the town on the further side, where they were to get canoes to take them across the pool to Ntamo. A walk of four or five miles from the river Zue, partly through a thick wood, brought them to the place, where the great river was spread out before them as though to take a rest before plunging over the rocks and falls below. The numerous sand islands give the broad expanse of Stanley Pool a very picturesque appearance, which surpassed their expectation, while all around, towering above the cliffs, were seen beautiful grass-covered hills rising to a great height. They found Ibiu (where the principal station of the missionaries will be formed with as little delay as possible), to be very near the position assigned by Mr. Stanley to Mankoneh's town, and from what they learned, Mankoneh is probably a mistake for Nga Mkuma, the latter word being the name for the Pool.

Their object being now to visit "Brazzaville," the station founded by M. de Brazza, on the opposite side of the Pool, they embarked in a handsome canoe, lent them by the chief of Ibiu, to cross the river. The canoe was about 50 feet long, hollowed out of hard African teak, and ornamented with a wickerwork pattern carved on the side. Full of joyous hopes, inspired by the friendly treatment they had experienced on the opposite shores, the two travellers were not prepared for the disagreeable reception which awaited them when their canoe struck the beach. The natives, in short, assumed a very hostile and threatening attitude; and it was only after some time had passed that the chief, Nga Liema, appeared and allowed them to enter the town, where they were assigned a house to sleep in. They passed a very uncomfortable night, owing to the uncertainty of their position; what happened next day may perhaps be best described in Mr. Crudgington's own words:—" On coming back to our " house, two marines (black men) came forward and addressed us in " French. They were dressed in uniform, and the ribbon on their caps " bore the name of *Eurydice.* One was a sergeant, and he presented a " paper written in French, and signed by two or three chiefs and M. le " Comte Savorgnan de Brazza, setting forth that certain places above " Stanley Pool and across to Nshasha were annexed to France. The " sergeant also told us he was left there with two marines to 'guard the " French flag.' Nga Liema very strongly protested that he had not sold " *his* country. The sergeant then told us that Ntamo was a small town, " that the chief, Nga Liema, was of no importance, and the people savages. " We thought it strange that Nga Liema should be such a small chief, when " to all appearance, and from Stanley's account, he was a powerful one. " But Nshasha we believed to be a larger town, or accumulation of towns, " and more important, and so it was consistent with the evidence of the " sergeant, who had been there some time, that the chief was also a greater " man, and better disposed than Nga Liema. The sergeant advised our " going there, offering to leave the marine with us that night, and promising to send a canoe the next morning to fetch us. . . . The next " morning the other marine came with a message from the sergeant " that the natives had taken out the large canoe to hunt hippopotami, " but that he would send perhaps the next day. The messenger had " come overland, and so we asked if we could walk. 'Oh, yes,' the " marine said; 'it is not far.' I have walked here.'" The party accordingly started to walk to Nshasha, the distance being about five miles and over very flat country. They crossed two or three small affluents of the Congo, and as they were nearing Nshasha, the second marine went forward to announce their coming. But when within a few hundred yards of the town, they were astonished by 150 or 200 hideously painted savages rushing out upon them, yelling and shouting in a threatening manner, and armed with knives, spears, clubs, and guns. The marine hurried on to Nshasha, but matters assumed such a serious and critical appearance that Messrs. Crudgington and Bentley thought it advisable to beat a retreat. This they did with as little appearance of haste as possible. Presently the sergeant overtook them, and explained that "M. de Brazza had told the people that they were Frenchmen, and that they were to guard their country if others came to take it from them." This, he said, was the cause of all the excitement; but his assurances to the natives that the visitors were friends, were of no avail, and in the end, without, fortunately, any serious mishap, he procured them a large canoe, in which they recrossed the Congo.

Little need be said about the return journey, as the party followed approximately the same route until they struck the river Luala, at a point much lower down than on the upward journey. After a walk of two miles from that point they entered a town near the Congo, within a very short distance of the station of the Livingstone (Congo) Inland Mission, which they had not passed on the outward journey, owing to the detour which they made to Kinkuka. Mr. Lanceley and Mr. Clarke, who were in charge in the absence of Mr. McCall, told them that they believed they were at Manyanga, but they had evidently fallen into some error, as Messrs. Crudgington and Bentley had passed that place four days previously. They pointed this out to them, giving the names of the intervening towns and the high mountain at the back, and telling them that they were just below the Itunzima Falls. As the natives near the river were very unfriendly, Mr. Crudgington and his companion determined to perform part, at least, of the remainder of their journey by water, and they accordingly started in canoes on February 26th. In some places they had beautiful stretches of smooth water, while at others they had to proceed with the utmost care, as there were bad rapids, and fierce, boiling whirlpools. In this way they reached Mr. Stanley's camp in safety, and the next day went some distance further down the river, partly in his steam-launch, and partly in the whale-boat. Three days' march by Mpambu a Ngulu, Ngandu, and Salika Banza, then brought them to Vivi on March 2nd. The time occupied on the upward journey from Vivi to Stanley Pool was twenty-one days, the return journey being accomplished, partly by water, in fifteen days.

Frequent elevations were taken during the journey by the pocket aneroid barometer previously referred to, heights being computed on the assumption that the water at Vivi is 100 feet above the level of the sea. Compass bearings were also constantly taken, chiefly with the prismatic compass lent by the Royal Geographical Society to the Rev. T. J. Comber. As the result of the calculations made during the journey, based mainly on their rate of walking, Messrs. Crudgington and Bentley think that Stanley Pool has been placed about a degree too far to the east, and should be in about 16° E. long., instead of in 17° E. long., as given by Mr. Stanley.

GEOGRAPHICAL NOTES.

Journey of Dr. Matteucci and Lieutenant Massari across Africa, from the Red Sea to the Gulf of Guinea.—During the past month a great geographical enterprise has been brought to a successful termination, which, at the same time, is rendered of tragic interest by the death of its leader, after he had safely landed in England on his way home to his native country. The circumstances are as follow:—On March 5th, 1880, Dr. Pellegrino Matteucci, already well and favourably known by his journeys in Abyssinia and the Upper Nile region, and Lieutenant Alfonso Maria Massari, an officer in the Italian Navy of high scientific attainments, left Suakin on the Red Sea, in company with Prince Giovanni Battista Borghese, with the intention of carrying out a grand scheme of exploration across Africa at nearly its broadest part, viâ Wadai and Lake Chad to the Gulf of Guinea. We have already * from time to time given some brief particulars respecting the earlier part of their journey, to Khartum, and thence by way of El Obeidh, the capital of Kordofan, to El Fasher, the capital of Darfur. From the latter place, after some little time, Prince Giovanni Borghese returned to Italy, and Dr. Matteucci and Lieutenant Massari passed onwards through Dar Tama, and after some delay caused by negotiations reached Abeshr, the capital of Wadai, in October 1880. Their letters from that place, which reached the Italian Geographical Society in January last, stated that they would return from Bornu by way of Tripoli, and arrangements were accordingly made for their reception at Bengazi and Tripoli; but nothing was heard of them until the end of July, when a telegram reached Rome, announcing their arrival on the Atlantic coast. Some information regarding the route followed is contained in a letter from Dr. Matteucci, written off the Canary Islands to a relative in Italy, and published in Bologna in the middle of last month.† It appears that after leaving Abeshr, in Wadai, the travellers spent some time at Lake Fittri, and then passed through northern Baghirmi round the south end of Lake Chad to Kuka, the capital of Bornu, occupying two months on the journey, which, but for the protection of the Sultan of Wadai, would never have been accomplished at all, owing to intertribal wars along their line of march.—From Bornu, Dr. Matteucci and Lieutenant Massari made their way to Kano, a town of about 50,000 inhabitants, and capital of the district of the same name in Sokoto (or Haussa). From that place they appear to have followed Dr. Baikie's route ‡ through Nupé to Zariya and Bida, and thence to Egga, on the Niger, which was reached on June 8th. Here they were most kindly received by Mr. Mackintosh, the agent of the United African Company, and conveyed in the company's launch to Akassa, at the mouth of the Niger, where they embarked for Liverpool in the steamer *Coanza*. They arrived in the Mersey on August 5th, and after being detained in Liverpool for nearly two days through the delicate state of Dr. Matteucci's health, proceeded to London, where, we regret to say, the leader died at about 8 A.M. on Monday, August 8th, at the early age of twenty-nine. As soon as the intelligence of Dr. Matteucci's death reached the officers of the Society, a telegram of condolence was at once despatched to Prince Teano, President of the Italian Geographical Society, with "the expression of our lively regret at the great loss sustained by Geographical Science in the death of the illustrious traveller, directly after completing his important journey across the African continent." Dr. Matteucci's body was embalmed by two Italian surgeons who were in London attending the International Medical Congress, as it had been determined that his remains should be buried at Bologna, his native town, and on August 13th a funeral cortége, consisting of the Italian Ambassador, General Menabrea (Marchese de Val Dora), and upwards of 100 of his fellow-countrymen, followed the coffin to the Charing Cross Station, where several speeches were delivered over it, previous to the departure of Lieutenant Massari for Rome.—Owing to the circumstances just mentioned, we are not yet aware what additions to our knowledge of the geography of North Central Africa will result from this expedition, which has been the first to cross the continent from the Red Sea to the Gulf of Guinea, but we understand that Lieutenant Massari has determined by astronomical observations the positions of several new towns and villages visited by him, which will be of great service for the more accurate mapping of the countries along his line of march.

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* See vol. ii. pp. 317, 507, 564, 691, 764.

† We are indebted to Signor Carlo A. Sandon, London Correspondent of the *Fanfulla*, of Rome, for calling our attention to this letter, and for other information.

‡ See R. G. S. Journal, vol. xxxvii. p. 92.

Notes from the Victoria Nyanza.—The Church Missionary Society have received intelligence that the Rev. P. O'Flaherty and Mr. C. Stokes left Kagéi for Uganda on February 25th, in company with the Uganda chiefs who were present at our evening meeting* of April 26th, 1880, and who were afterwards received in audience by the Queen on May 14th. They arrived safely at the court of King Mtesa on the 18th of March, and were warmly received by Mtesa, who expressed great satisfaction with Her Majesty's presents. A letter has also been received from Mr. C. W. Pearson, dated Rubaga, January 8th, stating that he and Mr. A. M. Mackay were about to leave Uganda, crossing Victoria Nyanza. The return of the three chiefs from Europe it is hoped may improve the relations of the English visitors with the capricious king. Mr. Stokes had availed himself of his sojourn on the south side of the lake to pay another visit to Lukongeh, the King of Ukerewe, who was very friendly. The Rev. G. Litchfield has established himself at Kagéi, where the people are also well-disposed.

Usagara.—Captain Bloyet, who was sent out to found a station in East Central Africa, has forwarded to the French Committee of the International African Association some notes on Usagara, Kofaranhi, Mkondôa, and Mburni. He states that the part of Usagara where he is, is very fertile, but at the same time very badly cultivated. The soil yields in abundance manioc, sweet potatoes, two kinds of beans, rice, sesamum, ground-nuts, the castor-oil plant, the sugar cane, maize, &c.

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* See vol. ii. p. 383.

There are few fruit-trees, and Captain Bloyet has only met with the banana and the papaw (*Carica papaya*); timber for building purposes is also scarce. The country abounds in game—gazelles, antelopes, giraffes, zebras, &c. The inhabitants pay no attention to the rearing of cattle or stock of any kind; but fowls are plentiful, and are largely sold to the passing caravans. The sky is nearly always cloudy, and the nights, and especially the early mornings, fresh. In the months of July, August, and September the highest readings of the thermometer are 78·8° F., and the lowest 59° F., and in October and November, 86° F. and 64·4° F. The inhabitants of Usagara, called Washenzi by the coast Arabs settled in the country, are of a gentle and timid nature. They are personally dirty in the extreme, and many of them suffer from ulcers, &c. Idleness is with them a virtue, and they cultivate only just enough to support life, nearly all the necessary work being done by the women. The greater part of their time is spent in drinking *pombé* and in smoking. They have no religion, but their medicine-man (mganga) is all-powerful. As regards social customs, husbands purchase their wives, and in case of domestic disagreements the price is returned to them. Their funeral rites are of the simplest, corpses being simply placed in a hollow tree or under a tree in the forest, with the obvious result that they are devoured by wild beasts. Captain Bloyet states that he has hitherto been in error in giving the name of Kondôa to the place where his station is being formed—Kondôa, or Mkondôa, is the name given to the tract of country comprised between the river Mkondôa on the one side, and Mburni, Kofaranhi and Mount Nyangara on the other. To the west of the station the river bifurcates, forming two islands. The two arms are called the Mkondôa Mdogo and the Mrogoro. The country between the Mkondôa and the Mkondôa Mdogo is uninhabited, and thickly covered with vegetation; it is, in fact, an impenetrable and tangled mass of lofty trees, giant creepers, and tall grass, swarming with hippopotami. Guata, which is composed of four villages, dominates the little plain lying between the Mkondôa Mdogo and the Mrogoro. The village of Mrogoro, formerly on the caravan-road, which has changed during the past three years, has been swept away in an overflow of the Mrogoro. Captain Bloyet mentions that he sends with his notes a sketch of Guata and the neighbourhood, and he adds that Koaâ-Mgungu is the proper name of the locality in which his station is placed.

French Surveying Expedition in West Africa.[*]—From a letter which Lieut.-Colonel Bordiaux, of the Bureau des Colonies at Paris, has addressed to the President of the Geographical Society of Bordeaux, we obtain some authentic information as to the progress made by Colonel Desbordes' surveying expedition during the season 1880-81, when he says they accomplished their programme almost in its entirety. Some difficulty was experienced in the ascent of the Senegal to Medina, where delay was caused by the non-arrival of *matériel*, and it was not till January 3rd that the column was able to start. The attitude of the people through whom they had to pass was very unfavourable, as Abdul Bubakar had excited the Kamera, Kasso, and Logo tribes against them. Workmen and beasts of burden disappeared on their approach, and the progress of the column was therefore very slow. After some trouble with the natives at Tukara, Colonel Desbordes arrived at Bafulabé on January 17th, and Kita on February 7th, at which latter place he had been directed to form an advanced post. Here he experienced much trouble and annoyance from the village of Gubanko (six miles distant), which appears to have been inhabited by a motley collection of robbers from the Bambarra, Mandingo, and other tribes. An attack was accordingly made on the place by a strong party, with four pieces of mountain artillery, and after a fight in which both parties suffered loss, the village was taken; and it was thought that this had great influence in inducing the Sultan Ahmadu to sign the treaty he made with Captain Gallieni. While the construction of the fort at Kita was being proceeded with, it was not deemed prudent to allow the topographical department to push their operations on to the Niger, and they were ordered to return to Medina by Bagniakadugu, Gangarran, and Fataki, in order to survey a route, which, according to native reports, leads from Bafulabé to Kita, without traversing any difficult country. It is stated that by means of the observations of this party, combined with those of Captain Gallieni's further towards the Niger, an easy route has been discovered for a railway. Major Derrien, the chief of the topographical part of the expedition, has lately returned to France, but during the coming season surveying operations are to be pushed on towards the Niger.

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[*] See vol. ii. p. 690.

The Chinese Province of Yünnan.—In the course of his journey from the Irawady to the Yang-tsze-kiang, of which some account was given in our August number,* Mr. Henry Soltau had good opportunities for observing the present condition of the Yünnan province, and his letters, which have been obligingly placed in our hands by his brother, supply useful information on this point. The people were found to be quiet, well-behaved, cordial and respectful to foreigners, and the climate is considered by all to be healthy (with the exception of some valleys), especially in the dry season. Goitre, as is well known, is very prevalent in the hill districts, and eye complaints were found to be exceedingly numerous. Trade is rapidly reviving everywhere, and there has been and still is a large influx of emigrants from the populous province of Szechuen. Many districts which in Mr. E. Colborne Baber's report are noted as being uncultivated and uninhabited, are now being brought under cultivation. Houses are springing up in all directions, and the people are beginning to rebuild their temples, which is a sure sign of returning prosperity. Mr. Soltau remarked that the cultivation of the poppy was extending, to the exclusion of almost everything else, to the new land now being cleared. He notes that sheep are being reared in large numbers for the sake of their wool, and that a strange custom prevails of shearing them three times a year; he mentions that they are never eaten in this province. Towards the close of his letters Mr. Soltau enumerates the various goods he saw being conveyed from place to place in the province, and to and from Burma, which show that considerable commercial activity now prevails. The difficulties, however, connected with the transport of goods from Szechuen into Yünnan are very great. They are first brought up by boats through the dangerous rapids of the Yang-tsze-kiang to Sui-fu, and are probably transshipped two or three times during that journey; they are then either transferred to other boats and taken up the Hêng river, or they are carried by men all the way to Chao-tung. Those conveyed by boat have to be transshipped once or twice on the Hêng river before reaching Lao-wa-tan, where, if bulky, they must be carried by men to Chao-tung, and there transferred to the backs of animals. The paths between these two places are far too narrow to admit of ponies or mules carrying bulky goods like cotton. The loads carried by the men are enormous, and are piled up far above their heads. These men walk a few steps and then stop to rest, supporting their loads on T-shaped sticks placed behind their backs. Mr. Soltau observes that "the strings of these men, all heavily laden, some walking in one direction, some in another, and others standing still, form a unique feature in the pretty landscape." There are some caravans of ponies, strong, sturdy little animals, which can take *Pu-êrh** tea, copper, and opium for Szechuen, and bring back light loads of salt and piece-goods of home manufacture. Owing to the much better nature of the road, Mr. Soltau feels no doubt that, but for the difficulty of getting through the Kakyen hill-tribes, a large proportion of the trade now entering Yünnan from Szechuen would come through Burma.

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* See *ante*, p. 493.

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* In his report on the commercial capabilities and economic products of the country traversed by the Yünnan Mission in 1875–6, Mr. Consul Davenport states that Yünnan-fu is the entrepôt of the famous Pu-êrh tea, which is grown in large quantities in that department on a range of hills called Kwang-shan (*lit.* bare mountains), of very considerable extent. The best qualities are in much request at Peking, but do not find their way to foreign markets, while the province generally is supplied with the inferior qualities. It is sold in little cakes, similar in shape to cakes of opium.—A sample of this famous tea was brought down from Chung-king by the delegates of the Shanghai Chamber of Commerce in 1869, and carefully examined. It proved to be sun-dried, and of a very choice and delicate character; its leaf was very young when picked, and in the picking the ends of the shoots, with the young leaves partially open, had been taken; it was full of pekoe, viz. the silvery looking down on the under side of the young leaves, and was of a green-tea class, as these fine teas generally are. Its delicate character and high cost quite unfit it for foreign markets.

Renewed Search for Relics of Leichhardt's Expedition.—In reference to the note on this subject in our April number,* our Associate, Mr. Eccleston Du Faur, informs us that no confirmation of Mr. J. R. Skuthorpe's alleged discoveries had reached Sydney at the end of May, and that in consequence of his non-arrival there people have lost confidence in his statements. At the same time Mr. Du Faur sends us a copy of a letter which Mr. Skuthorpe senior has received from another of his sons, dated Blackall, Queensland, April 18th. The writer states that he has seen his brother, who still maintains that he has the relics, but that they are buried at a place 100 miles distant, adding that he intends to go to Sydney as soon as he has disposed of a number of horses in which he is interested on the Alice river. Mr. Du Faur points out in his letter that the original statement that an aged white man had died among the aborigines west of the Herbert river, leaving adult half-caste children and articles of European manufacture, did not come from Mr. J. R. Skuthorpe, but from two of his brothers, men of a very different stamp, at whose instance he made his last expedition to that region. Should it prove that they have been imposed upon, it is believed that they will endeavour to verify their own statements by further research. We also learn from the *Colonies and India* that our Associate, Sir Ferdinand Müller of Melbourne, who has for many years taken a deep interest in this subject, is again moving in the matter of another search for the remains of Dr. Leichhardt, and is desirous that a fresh expedition should be fitted out to search the district where Hume stated that he had found traces of the lost expedition, embracing the unexplored country north of Lakes Eyre and Amadeus, and east and west of the telegraph line. It is further stated that Mr. Ernest Giles, who in 1880 received one of our gold medals for his previous explorations in Australia, is prepared to undertake the leadership of such an expedition, which, if it had no other result, would certainly add largely to our knowledge of Central Australia.

Tunis.—Though some time will probably elapse before we are in full possession of the geographical results of the French expedition to Tunis, we know † that Lieut.-Colonel F. Perrier, President of the Central Commission of the Geographical Society of Paris, was sent to Tunis to organise the topographical service and to obtain cartographical information generally. From the material he collected Colonel Perrier, who is attached to the Bureau des Longitudes, has prepared a map of the Kroumir country, which was previously but very imperfectly known. This map, we believe, will be published almost immediately by the Dépôt de la Guerre, and is looked forward to with much curiosity in Paris. It is stated that, in opposition to what was thought to be the case, almost all the rivers in the Kroumir country are found to be tributary to the river Mejerda, and that the streams which flow directly into the sea are of no importance. The Tabarka plain, too, which was considered to be the entrance to valleys leading far into the interior, is found to have no outlet in that direction.

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* See *ante*, p. 227.

† See *ante*, p. 501.

eeting of the International Geographical Congress at Venice.—As announced in our April number, the Venice Meeting of the International Geographical Congress will commence on the 15th of September; the Exhibition of Maps and Geographical Appliances being open from the 1st to the 30th of the month. Our President, Lord Aberdare, Sir A. H. Layard, G.C.B., and Mr. John Ball, F.R.S., will attend the Congress as delegates from this country; and British cartography will be represented in the exhibition by series of maps contributed by the Indian Government, the Hydrographical Office, and the Ordnance Survey; Lieut.-Gen. Sir H. E. L. Thuillier and Colonel Haig attending respectively on behalf of the Indian Government and the India Office. The British Vice-Consul at Venice has been authorised by our Government to render assistance to British exhibitors.

Obituary.

Rev. Richard Greswell, F.R.S.—We regret to have to record the death, on his eighty-first birthday, of the Rev. Richard Greswell, one of the oldest Fellows of our Society, whose name will be found in the original 'List of Members of the Geographical Society, August 4th, 1830,' given by Mr. Clements R. Markham in his memoir on the fifty years' work of the Society, which was published in the fiftieth volume of our Journal. Mr. Greswell was for a great number of years Fellow and Tutor of Worcester College, Oxford, in which university he graduated as far back as 1822, taking a very high degree. Our Associate was a man of great learning, but, so far as we are aware, he was not the author of any works. He was an Honorary Fellow of Worcester College up to the time of his death, which occurred at Oxford on July 22nd.

Mr. William Man.—We regret to record the death of Mr. William Man, the younger, of Bromley, St. Leonard's, and Woodford, Essex. Our Associate, who died suddenly on May 16th, was the eldest son of Mr. William Man, of Bromley, St. Leonard's, and was born in December 1818. Early developing a taste for travel and adventure, he made his first voyage to North America, nearly every part of which he subsequently visited on other occasions. Later on he turned his attention to the East, and travelled in Ceylon, after which he proceeded to our Australian Colonies, Mauritius, and the Seychelles. His last lengthened expedition, made in company with the well-known Mr. Rarey, was undertaken in the Holy Land, and some portions of Asia Minor and Arabia. Mr. Man was elected a Fellow of our Society in November 1872, and when in England was a constant attendant at our evening meetings.

CORRESPONDENCE.

The Chukches and their Neighbours in the North-Eastern Extremity of Siberia.

U.S. Coast and Geodetic Survey,
Washington, D.C., *July* 28*th*, 1881.

I have succeeded in getting hold of a copy of the January number of the 'Proceedings,' and discover in it an ambiguity * which probably explains in part Lieutenant Nordqvist's criticism, noted in the June number,† but as he evidently is partially in the dark about the distribution of the natives in the north-east extreme of Siberia, I would ask leave to bring before the Society the following notes explaining the situation there and the distribution of the people, as far as I am able to throw any light upon it. The problem there is a very complex one, and will, I fear, only be properly solved when some one with a good knowledge of philological methods of research and posted in regard to the difficulties shall actually devote a year or two to working it out.

This peninsula is inhabited by two races who live in intimate commercial union, but who possess radically different languages, who do not intermarry, and whose modes of life are for the most part perfectly distinct. They communicate with each other and with the whalers and traders, by means of an ungrammatical jargon composed of words of both languages, and this jargon, being written down by travellers as the real language of the people, has been the main agent in producing the present confusion. It contains also some mutilated Russian and Hawaiian words (and possibly a few Portuguese), and these latter are most abundant in the jargon of those individuals who have had the greatest amount of intercourse with whalers, whose crowded decks hold numerous representatives of several countries. Several of the coast dwellers have been many voyages with whalers, one, Cornelius of Plover Bay, has spent ten or fifteen years in the United States, has visited Washington and New Bedford as well as San Francisco, and speaks very excellent English. There are several others who speak good English, though not quite as fluently as Cornelius, and from these men, during three distinct visits to these shores, as well as from my friend Mr. George Kennan, who has seen more than almost any one else of the interior residents, and from whalers who have traded with them (and speak the jargon well) for ten or fifteen years, I have derived my data.

The interior is peopled with roving bands belonging to different branches of the Korak (or Kariak) nation, who are distinguished by different names, as Deer Koraks, Dog Koraks, Chukches, Reindeer men, Wandering Chukches, &c. They all speak dialects of the Korak tongue, and chiefly depend upon the reindeer for their subsistence. According to Wrangell, several bands long since lost their deer, and settled along the north coast of Siberia, eking out a precarious subsistence by the shores. Such, for the most part, I presume to be those met by Nordenskjöld's expedition, and which have been by some confounded with the Eskimo (properly Innuit) race which inhabits the shores from East Cape round by Plover Bay to Cape Olutorsk (to my certain knowledge), and, as I have been informed by the traders, even to Koliuchin Bay or beyond. It being remembered that the Korak people inhabit the whole of the interior (coming close to the coast at the head of Plover Bay, St. Lawrence Bay, &c.), and that some of them are almost always present in the Innuit villages, on commercial or other business, and accompany the parties or

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* Vol. iii. p. 47.

† Ibid., p. 36.

Innuit who board the whalers and traders for barter, and chiefly supply the latter with fresh reindeer meat when wanted, and that each locality has both a Korak and an Innuit name, and that the jargon of both languages is the means of communication,—and it will be realised how great the difficulty is for a transient visitor to disentangle.

The Innuit race, as I stated in my letter of last January, calls itself Yūit′, being their word for people. The inhabitants of each village call themselves by the village name with *mūt* or *meŭn* added, for an individual or a large number of individuals respectively. In the jargon they call themselves "Mătsiṅkā" men, meaning "good" people. They call the American Eskimo (Innuit) with whom they are not on friendly terms, "Năkū′rŭks," from the word *Năkū′rŭk*, meaning good, by which the latter designate themselves in their trading jargon, but which the Asiatic Innuit use as a term of derision. These Asiatic Innuit have been called Sedentary Chukches, Namollo, Tuski, Bowhead men (in allusion to the Bowhead whale which they pursue), whaling and fishing Chukches, &c., but their own name for themselves is Yū-it′, an evident derivative of *Innūit.* Those of the *Chūklūk* village on Seniavine Strait call themselves *Chūklūk-mūt.* Most of their nouns are identical with those of the American Innuit of Norton Sound. Men from the village on Indian Point (Cape Chaplin) called the Korak people or "deermen," *Koi-ēē′-khĭt*, the special meaning of which I could not find out, but I believe it is not complimentary, and corresponds to "*Ing′-kal-eet*," the term which the American Innuit apply to the Indians of the interior of Alaska.

Now we learn from Erman that the so-called "Chukchees" in the western part of this peninsula, bordering on the Anadyr, call themselves *Tsau-chū.* At Plover Bay I ascertained beyond a reasonable doubt that those belonging in that vicinity call themselves *Tsau-yū* (or collectively, *Tsau-yū-at*); according to Stimpson, those of Seniavine Strait call themselves *Tsau-* (or *Tsū*) *tsin*, a form from which the word Chukche might easily be derived. Those of the vicinity of St. Lawrence Bay call themselves *Tsau-gū;* and, on the northern coast, according to Nordqvist they call themselves "*Chau-chau*" (plural *-ate*) which I suspect to be merely a rendering of the term given by Erman.

The supposition that the Innuit race are only found west and south of Cape Chukotski is erroneous. My own experience during three voyages, and the united testimony of both natives and traders, have left no doubt in my mind that the East Cape village is essentially an Innuit settlement, though it may contain some Korak residents. I suspect that they extend much farther to the westward on the north Siberian coast, but of this I have only the evidence of intelligent whalers and traders such as Captains Redfield, Owen, Smith, and Herendeen, who have had ten or fifteen years' experience with them, and who all clearly recognise the racial distinctions.

The Innuit never own deer; the Korak, while he may be, by poverty, degraded to a fisherman's estate, never goes whaling. The Innuit travels with dogs when he has them; builds boats and sells them covered with walrus or seal hide to the Korak for his river navigation. He is paid in dried sinew, suet, and tame reindeer skins.

There are Koraks who use dogs for travelling; some live on tributaries of the Anadyr, but there are no deer-driving Innuit.

The inhabitants of the Diomede Isles and of St. Lawrence Island (Shee-wo-khŭk) are Innuit, and are active middle-men or traders between the two continents. The Asiatic Innuit never visit the American coast, but the Diomede islander visits both coasts, reaching as far on the east as Norton Sound, and on the west occasionally to the Gulf of Anadyr.

The names of the Diomedes have been variously spelt. The following rendering from the lips of the inhabitants of the larger Diomede island were taken down with great care, and may be worth preserving:—

1. Big Diomede, Im-āh-khlŭk′.
2. Small „ Ing-āh-khlŭk′.
3. Fairway rock, Wēē′-yŭh.
4. East Cape, Nū-wŭkh′.

Inhabitants of No. 1, Imāh-klēē-mūt′.
„ „ 2, Ing-ŭh-klēē-mūt′.
„ „ 4, No-ghwāh-mūt′.

They call the reindeer men, or Korak people, Kŭgh-ŭkh-tŭz′-ū-mūt′.

In conclusion, I would call attention to the great ethnological interest of this remote corner of the world, and to the great need of a thorough study of the few people who inhabit it. Their languages are very complex, and need study by some one already having some knowledge of the Eskimo dialects. A year or two are imperatively needed to get at the facts in a thorough manner. It would be better to approach them from the vicinity of the Anadyr posts, where the pure Korak dialect is spoken and the jargon has not penetrated. I had hoped for good results from the journey of the Drs. Krause, but their plan has been changed, and their time will be too limited for them to accomplish much.

I remain very truly yours,
Wm. H. Dall,
Asst. U.S. C. Survey.

N.B.—The length of our cruise in 1880 was not twelve hundred miles, as given in the 'Proceedings,' but *twelve thousand*, a good stretch to cover with a 100-ton schooner.

ERRATA.

Major Raverty desires us to notice the following misprints in his letter in the August number:—

Page 498, line 11, *for* "G*h*annīn," *read* "Ghaznīn."
„ 499, lines 7, 13, and 15, *for* "Tāj*n*īk," *read* "Tājzīk."

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—August 5th, 1881: M. Daubrée, of the Institute, in the Chair.—The President announced the deaths of Vice-Admiral Fleuriot de Langle and M. H. Bionne, both well-known members of the Society. M. Fleuriot de Langle had rendered numerous services to geography, especially on the west coast of Africa, in Senegambia, and the Gaboon. M. Bionne, who had been in early life in the navy, was General Secretary of the Panama Canal Company, and had recently published a remarkable book on Dupleix and his policy in India.—A telegram was read from the Italian Geographical Society at Rome, announcing that the Italian travellers Dr. Matteucci and Lieutenant Massari had succeeded in crossing the continent of Africa from Egypt to the mouth of the Niger.—A communication was then read from M. Ledoulx, French Consul at Zanzibar, giving recent news of French travellers and missionaries in Eastern Africa. The station founded in the interior, at Mkondôa, 150 miles distance from the coast, by the French Committee of the International African Association, was progressing well, but its chief, Captain

Bloyet, had been obliged to return to Zanzibar on account of his health. The Sultan had sent supplies to the Catholic missionaries, and their position, although still precarious, was reported to be much improved.—Extracts from a letter of M. Wiener, Vice-Consul of France at Guayaquil, were then read, announcing his departure on a journey of exploration to the Upper Amazons and its affluents.—M. de Ujfalvy next gave the Meeting details regarding certain tribes of the Himalaya.—M. J. Jackson then reported the results of his recent visit to the United States, undertaken on behalf of the Society. The public departments at Washington had placed at his disposal for the Society, copies of all the maps and books necessary for the completion of their collections. He also announced that Captain Wheeler, of the U.S. Topographical Survey, had arrived in France on his way to the Geographical Congress at Venice, where he would officiate as United States Delegate; and that General Powell was superintending the preparation of a new map of the United States, on the scale of 1:250,000.—A paper was read by Mr. A. W. Mitchinson on his travels in Western Africa. Regarding Senegambia he made the important statement that this region, during some months of the rainy season, became an island, as represented in one of the old *Portulanos*. The junction of the upper basins of the Senegal and the Gambia was utilised by the natives for trading purposes, and it was the same with regard to the upper basins of these two rivers and the Niger.—At the close of the meeting the General Secretary announced that the Congress of French Geographical Societies would be opened at Lyons on the 6th of September, and that the International Congress would meet at Venice on the 15th of the same month.

Geographical Society of Marseilles.—August 12th, 1881: M. ALFRED RABAUD, President, in the Chair.—After a few words, expressive of a hearty welcome, from the Chairman, M. Georges Revoil, who has just returned from his scientific expedition to Somâli-land, gave some account of his journey, chiefly in the form of a general sketch of his itinerary, without dwelling much on the difficulties he had surmounted. During the ten months which he had spent in the country of the Mijjertains, the Warsingalis, and the Dulbahantas, he had traversed the interior as far as the Karkar Mountains, at the foot of which, on the northern side, winds the Darror, parallel to the river Nogal on the southern side. Not being able to push his way any farther, in consequence of the systematic opposition which he met with, and against which he could not struggle without compromising his safety, he resolved to return to Aden, after visiting certain points on the coast. Being detained by bad weather near Hais, in a small creek named the Salwine, M. Revoil landed to get ballast, and found on the banks of the creek a great number of *tumuli*, similar in every respect to those which he had met with in all parts of the country, and had photographed in the course of his expedition. For the first time, and not without danger, he succeeded in partially excavating one of these *tumuli*, and brought to light a tomb and close alongside some remains denoting the former existence of a very advanced civilisation, including some superb enamels, fragments of pottery from Samos, and a mask, indicative of a Greek colony. Taking the observations of Dr. J. C. Prichard, who described a type, in connection with the information he obtained himself in regard to the existence of a white Galla race living farther south on the borders of Webi, M. Revoil put forward the suggestion that the present Somâli race bears the marks of the existence of a white colony, very probably Macedonian, and that this colony, according to the traces he met with in the interior, has been preserved almost intact in this white tribe of Gallas. M. Revoil found besides in their idiom, arms, and dress, strong arguments in support of his opinion, which he further corroborated by an important series of profile photographs.—At the close of the meeting the Chairman thanked M. Revoil for his paper, and promised to give him another opportunity for furnishing fuller details of his explorations.

Geographical Society of Berlin.—July 7th, 1881: Dr. NACHTIGAL, President, in the Chair.—Letters were read from Dr. Schweinfurth, one from Aden dated June 12th, and a second from Cairo dated June 25th, in which he announced that he had returned from his visit to the island of Socotra, in company with Dr. Riebeck, who had planned to explore that island in the course of his journey round the world. Dr. Schweinfurth left Aden on the 12th of March and spent a month in botanical researches on Socotra, the flora of which is extremely rich; quitting it on the night of the 17–18th of May in an undecked and heavily-laded Arab vessel. It had been hoped that the despatch-boat in which Captain Hunter, the British assistant Political Resident, was accustomed to make an annual visit to Socotra would have been available for the return journey, but in this they were disappointed, as the vessel was unexpectedly called elsewhere on account of political complications; thus Schweinfurth was obliged to trust himself to the Arab dhow, in order to escape the approaching south-west monsoon, which would render communication with the mainland for many months impossible. He hoped to reach Makallah, the chief place on the south coast of Arabia, where Sultan Nakib Omar was expected to give him a friendly reception and help him forward on his journey. A passage in some Arab vessel going to Mascat (where Bombay steamers call on their way) might perhaps be found at Makallah, or the Sultan Nakib might help him to obtain camels for the land journey of 250 geographical miles thence to Aden. Nakib had, however, broken his alliance with the English, a war was imminent, and the position of the travellers was most critical. Their supply of water was exhausted, and the twenty-eight men in their heavily-laden vessel of scarcely 40 tons burthen were in great danger. Fortunately a favourable wind sprung up and they were able to sail 30 miles farther along the Arabian coast, as far as Shéher, the town of the Jemadar Abdallah. Here the travellers were delivered from their perilous position, through the English man-of-war *Dragon*, Captain E. Grey Hulton, which was blockading Makallah. They were received with the greatest hospitality on board and remained for three weeks the guests of the English, although the ship was already overloaded, and the addition of the travellers with their followers and voluminous baggage was a serious and difficult charge. Schweinfurth wrote:—"When we wished to apologise for the inconvenience which we had caused, the captain replied, 'We are sure that a German man-of-war would have treated English travellers just the same under similar circumstances.'" The party reached Aden on the 12th of June. According to Schweinfurth, the collections made at Socotra, although only part of the island was explored, are of great scientific value. The zoologists of the expedition, Dr. Mantey of Berlin and C. Rosset of Freiburg, had collected amongst other things forty skulls of the aborigines, taken in perfect condition from the ancient burying-places which eveywhere abound.—A communication was then read from Dr. O. Finsch, who is now exploring Polynesia, at the cost of the Prussian Academy of Sciences. It related to the manners and customs of the inhabitants of New Britain, amongst whom the traveller had lived for a long time engaged in zoological researches, and animadverted severely on the proceedings of the white traders in these regions. Dr. Finsch had collected 170 skulls in New Britain, 110 in Micronesia and Melanesia, and 65 casts of faces in plaster of Paris; besides 12,000 specimens of zoological objects. As regards mammals, the missionary, the Rev. G. Brown, had previously sent home large collections from New Britain and the neighbouring islands, so that Finsch expects to have discovered few absolutely new species. Dr. Finsch's communication would be printed in the "Zeitschrift" of the Society.—A short paper was next read from Dr. J. M. Hildebrandt, the well-known traveller in Madagascar, giving a description of the original customs of the inhabitants. These were probably the last lines this enterprising traveller ever wrote, for a telegram from the German Consul in

Madagascar reached Berlin a few days after the meeting of the Society, announcing Dr. Hildebrandt's death, of a long-standing liver disorder, at Antananarivo on the 29th of May.—It was announced that the African traveller Major von Mechow had reached Lisbon on his way home. In company with two other Germans he had followed the Quango down to within six days of its junction with the Congo, but was forced to return up stream from that point, on account of his carriers refusing to pass a dreaded tribe of cannibals lying in the way. He discovered three large waterfalls on the Quango, which he had named respectively after the Emperors of Germany and Austria and the King of Portugal.—A paper was then read on his topographical researches in the Troas, by Dr. H. Schliemann, in which the author stated that he had succeeded in identifying with tolerable certainty the sites of twelve places in that district mentioned by Homer, Herodotus, Strabo, and other classical writers.—A paper by Dr. Bastian on the migrations of the Polynesians, founded on his own researches during his late journey among the islands, concluded the meeting.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Baddeley, M. J. B.—The Highlands of Scotland (as far as Stornoway, Lochinver, and Lairg), with a full description of the various routes from England and the principal places of interest upon them, including Edinburgh, Glasgow, Melrose, and the Falls of Clyde. London (Dulau): 1881, 12mo., pp. 269, maps and plans. Price 5s.

This handy little volume of the "Thorough Guide Series" is on the same plan as the author's Guide to the Lake district, deserving mention for the excellent maps (by Bartholomew), which are coloured to indicate contours of altitude at 500, 1000, and 2000 feet.

Harper's Hand-Book for Travellers in Europe and the East: being a Guide through [vol. i.] Great Britain and Ireland, France, Belgium, Holland, [vol. ii.] Germany, [Austria], Italy, Egypt, Syria, Turkey, Greece, [vol. iii.] Switzerland, Tyrol, Denmark, Norway, Sweden, Russia, and Spain. By W. Pembroke Fetridge. New York (Harper and Bros.): 1881, 3 vols. sm. 8vo., vol. i. pp. xxvii., 1–535; vol. ii. pp. 547–1003; vol. iii. pp. 1017–1580; Index, pp. 35, to each vol.; maps in covers and maps and plans in text. (*Dulau*: price 2*l.* 2*s.*)

This twentieth Annual issue of 'The American Traveller's Guide,' a more bulky representative of Murray's Handbooks, is now divided into 3 well got up volumes, as conveniently arranged as their size permits. Most of the countries referred to are stated to be entirely re-written, from personal observation, with important additions and corrections as to the others, brought down to a later date than any European work of the same nature.

New maps of Switzerland (with 69 routes marked), England, Scotland, Ireland, France, Germany, Italy, and Spain (234 routes marked), and general Europe, are stated to be given in this edition. The whole work now contains 120 maps, plans, and diagrams, "three times as many as are given in any other Hand-book of Travel,"—in making which estimate, the author overlooks the fact that this large publication represents many volumes of Murray or Baedeker.

A sketch of the United States is given at the end of vol. iii. for the benefit of returning American Travellers.

Perret, Paul.—Les Pyrénées Françaises. Première partie. Lourdes—Argelès—Cauterets—Luz—Saint Sauveur—Barèges. Paris (Oudin): 1881, large 8vo., pp. 356, plates and cuts in text. (*Dulau:* price 10*s.*)

Among the objects of interest represented in the illustrations by E. Sadoux, many of which are of considerable merit, will be found some of the more prominent physical features, such as the gorge of Gavarnie (p. 230), a snow-bridge (p. 265), and various peculiar rock structures.

Weber, Max Maria von.—Die Wasserstrassen Nord-Europa's. Ergebnisse von im Auftrage des Herrn Königl. Preuss. Ministers für öffentliche Arbeiten unternommenen Studienreisen. Leipzig (Engelmann): 1881, 8vo., pp. 397, maps, plans. (*Dulau:* price 10*s.*)

This posthumous official work, the commencement of a practical study of the water-ways of Northern Europe, is for its greater part devoted to those of England, concluding with a much shorter reference to Sweden. An historico-geographical account is given of the development of the natural and artificial means of water traffic in this country, followed by details of more interest to economists and hydrographic engineers. In the discussion of Swedish rivers and canals, the influence of the physical formation of the country is naturally of greater importance than in England.

The maps represent England (scale 1:1,250,000) with its rivers and canals, the connection with railways being indicated by different colours, and South Sweden (same scale), showing the water-connections. Smaller maps of Scandinavia are given, representing the parallels of freezing and thawing as regards fresh-water, and the January and July isotherms.

ASIA.

Hunter, W. W.—The Imperial Gazetteer of India. Vol. vii. Naaf to Rangmagiri, pp. 555; vol. viii. Rangoon to Tappai, pp. 537; vol. ix. Tapti to Zut-thut, and Index, pp. 478. London (Trübner): 1881, 8vo., maps. Price 1*l.* 1*s.*

These three volumes complete the great work of which the first six were noticed in the present vol. of our 'Proceedings,' p. 440, the whole being supplied to the public at the disproportionately cheap price of 3*l.* 3*s.*

In a postscript, Dr. Hunter acknowledges his obligations, both as regards this Gazetteer and his Statistical Survey of India, to the 30 thick folio vols. of MS. by Buchanan-Hamilton (familiar to naturalists as a scientific Ichthyologist) now placed in the India Office; and he gives a brief summary of the career of that well-known authority.

The excellent Index, which is 182 pages long, would almost form a volume by itself, and is so constructed as to bring to a point and render available at a glance the stores of information gathered in the 240 districts of India during the past twelve years. A modest list of errata is acknowledged for the preceding 7 volumes, at the rate of about one for each hundred pages; and if this is any approach to the real number of mistakes or misprints, it reflects the greatest credit on all concerned in the preparation of such a work.

As in the former volumes, the larger articles, such as Rajputana, Surat, Nilgiri Hills, Tinnevelli, &c., are complete treatises of themselves, giving under different headings interesting particulars of the physical aspects (including botany and natural history), population, history, agriculture, commerce, administration, medical aspects, &c., of each district.

AFRICA.

Cowan, W. Deans.—The Tanala. Faravohitra (Friends Foreign Mission Association): 1881, 8vo., pp. 14, map.

The author (a member of the London Missionary Society), already known to scientific men by his papers on the Birds, *Lepidoptera*, and Ferns of Madagascar, here gives a general description of the district known as Tanala (an area of at least 2800 square miles), lying between 20° 30′ and 22° 20′ S. Lat., and 46° and

46° 30° E. Long., in South-east Madagascar, together with its people. Tanala proper begins on the eastern edge of the dense forest which clothes the sudden dip of the high central land of Madagascar towards the sea; but no definite boundaries exist on the eastern side, and the most southern part is still unexplored. All its rivers are turbulent and un-navigable, and many of them have falls of some magnitude, especially the Matitànana. Outcrops of iron of great richness exist in the western part; and a hot mud spring of 112° Fahr. was visited, near the Inamarona.

The author gives a list of 104 trees and shrubs found in the district, with some of their native uses; and a very clearly and well executed sketch map of the Tanala and the eastern and western neighbouring districts (scale 8 miles to the inch) from his own survey; this is drawn on stone by a native and lithographed at the Mission Association Press, Antananarivo.

Schütt, Otto H.—Reisen im südwestlichen Becken des Congo. Nach den Tagebüchern und Aufzeichnungen des Reisenden bearbeitet und herausgegeben von Paul Lindenberg. Berlin (Reimer): 1881, 8vo., pp. 180, maps. (*Williams & Norgate:* price 6s.)

Forms the 4th Heft of the ‘Beiträge zur Entdeckungsgeschichte Afrika's.”

Herr Schütt having accepted office in Japan, the already commenced task of working up the journals kept by him during his explorations of the lower waters of the Quanza and the south-western basin of the Congo in 1878–9, has devolved upon Herr Lindenberg. The chief features of these journeys have been from time to time recorded in our ‘Proceedings’ (see vol. i. p. 808); but the present volume gives the details in narrative form.

Herr Schütt left Lisbon in November 1877, arriving at St. Paul de Loanda on the 10th of the following month. Early in January 1878, he steamed in three days up the Quanza to Dondo; and he notes the extraordinary abundance of crocodiles in this part of the river, having himself seen no less than four people destroyed by these reptiles during his passage to and from Dondo. After staying three weeks, during which he visited the Cambamba Falls, the journey was resumed by the so-called “royal road” to Malange, a mere track, in spite of the great caravan traffic; and Pungo-a-N'Dongo (meaning “The great Fetish of the N'Dongo”), the next white station, was reached after a four days' march parallel with the Quanza.

After a short stay, the traveller again started over the plateau to Malange, which was reached on February 22nd; at this place, the last Portuguese post on the road to the interior, he remained until the beginning of July, making excursions to the Quanza on the south, in the course of which he discovered the Empress Augusta Falls, and reached Lucunga and the Loando affluent of the Quanza. After a description of Malange, the author at this point gives an interesting general sketch of Angola, its vegetation, climatic conditions, fauna, and ethnography.

Resuming his journey to the interior in a north-easterly direction, Talla Mungongo was reached by the middle of July, and found to be the falling away of the plateau forming the commencement of the Quango basin. Near Cafuchi was the residence of the Yaga N'Dalla Quissua, Lord of Bondo Land, of the inhabitants of which many details are given, with a short historical sketch of the neighbouring Bangalas.

After crossing the Lui, Herr Schütt met with hostility on the part of the Bangalas, who robbed him of his stores and compelled him to turn back. He now made a detour to the south-west, parallel with the road by which he had come, eventually turning again south-east through Songo Land, recrossing the Lui at its upper waters in Mulundu, and the upper Quango in M'Pungo, and reaching Kimbundo in Quioco in the middle of November. Thence his course was north-east and north, by the right bank of the Luvo, the upper waters of the Luele, the right bank of the Quicapa, and the Luaximo, which last river he ascended to Mai Munene (about 6° 50′ S. Lat.), returning southward by the right bank of the Luaximo to the residence of the Muata Musevo (son of the Muata Yamvo), who practically compelled him to stay in his capital, which was reached early in February 1879. An excursion was here made towards

Cahungula to the east, and the return to the west coast then commenced. This was effected by a north-westerly route, crossing the Quicapa, Luvua, Luchico, and Loangue (parallel southern Congo feeders), and then by a south-westerly one through Lunda, cutting the Cuilu and Quengo, which also eventually empty themselves into the Congo, and finally again reaching the Quango on April 14th. After crossing the river into the Cari country, the traveller soon struck his former route near the Lui, meeting with no opposition this time from the Bangalas, and returned by Malange as he came. The whole of the latter part of the journey from Kimbundo is comparatively hurried over in the description.

The work is well illustrated by three maps by Kiepert, on which every possible indication of physical conditions is afforded by colour, &c. The first one (scale 1 : 600,000) includes from St. Paulo de Loanda to a little east of Pungo-a-N'Dongo, and also shows Dr. H. von Barth's 1876 more northern route in the Bengo and Luculla districts (with various insets of physical features, including a view of the Luculla Falls); the second and third (scale 1 : 1,000,000) give very clearly the whole region traversed by Herr Schütt (No. 3 covering nearly from 6° to 11° S. lat.), containing many incidental notes of geographical and ethnographical value.

AMERICA.

Reclus, Armand.—Panama et Darien. Voyages d'Exploration. Paris (Hachette): 1881, 12mo., pp. 418, maps, illustrations. (*Dulau: price* 3*s.* 6*d.*)

A copiously illustrated account, written in a lively style, of the author's explorations in the American Isthmus from 1876 to 1878. Much topographical detail is given in it, of a region now of especial interest, and the difficulties of exploration in which are well conveyed by the text and woodcuts. The maps consist of one of the Isthmus of Panama, with the rail and canal proposed by Lieutenant Wyse and the author, and adopted by the International Congress of 1879; and a general one of Southern Darien by Lieutenant Wyse.

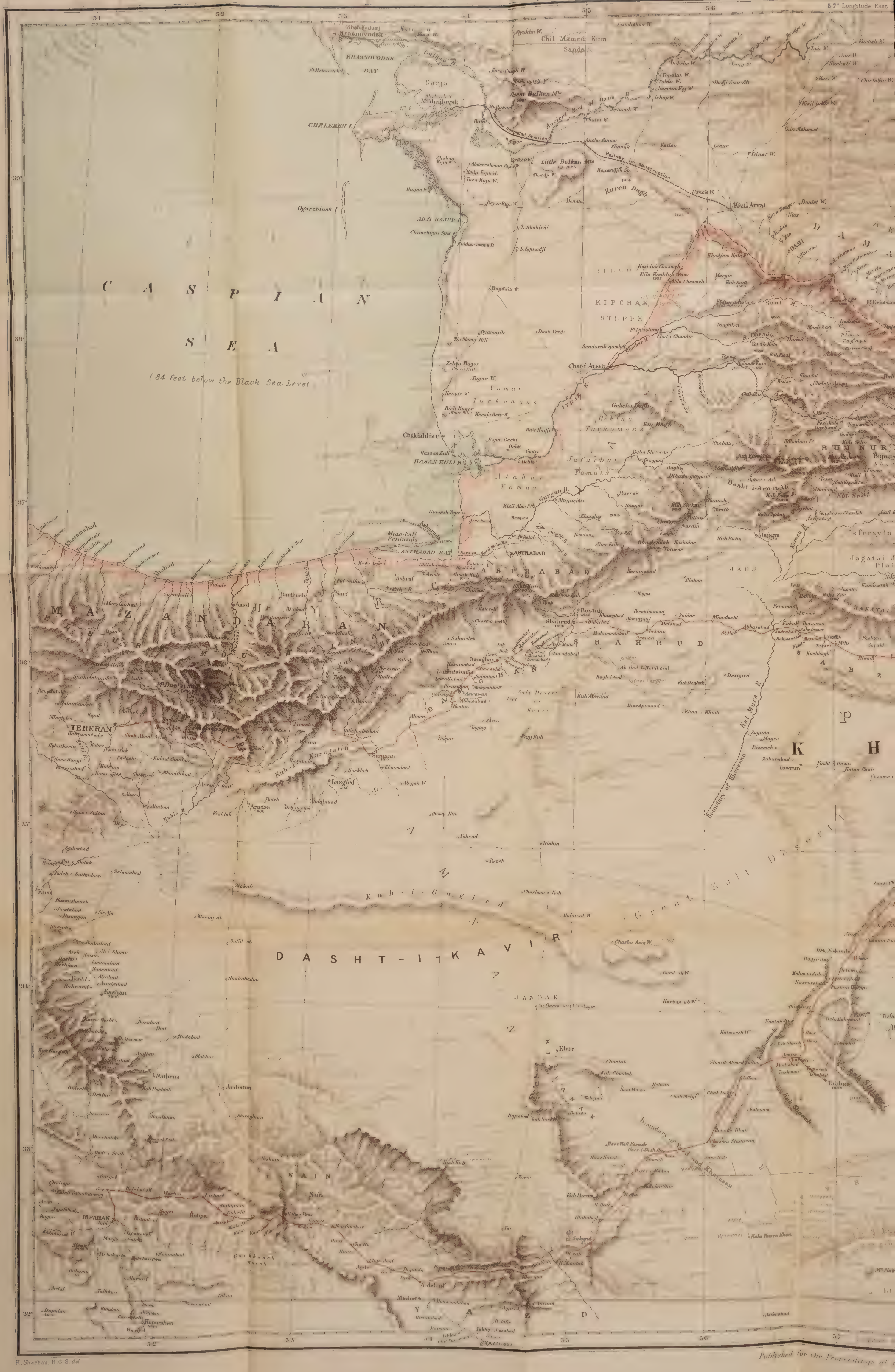
Reclus, Elisée.—Voyage à la Sierra-Nevada de Sainte Marthe. Paysages de la Nature tropicale. Seconde édition. Paris (Hachette): 1881, 12mo., pp. 337, illustrations. (*Williams & Norgate: price* 3*s.* 6*d.*)

From the preface, the first edition of this early work of its now well-known author would seem to have been published in 1861; his journey to the United States of Colombia, then known as New Grenada, having been made in 1855. His explorations continued for two years, chiefly in Santa Marta and the mountains east of it, which are well shown on the small map accompanying the work.

Wieser, Dr. Franz.—Magalhâes-Strasse und Austral-Continent auf den Globen des Johannes Schöner. Beiträge zur Geschichte der Erdkunde im XVI. Jahrhundert. Innsbruck (Wagner): 1881, 8vo., pp. 122, maps. (*Williams & Norgate: price* 5*s.*)

This contribution to the literature of archaic geography consists of discussions of the 1520 Nürnberg, 1515, and later globes of Schöner (not Schoner, as it is usually written); the sources of that Professor's knowledge, especially as to his exposition of the Southern passage, the Straits of Magalhâes, and the Australian continent; the pretended map of Martin Behaim with Magalhâes-straits, and the World of Leonardo da Vinci. Dr. Wieser adds some remarks on subjects of interest, such as the oldest cartographic monuments with the name America; the earliest occurrence of the name Brazil; the gradual discovery of a fifth great world-section, and the introduction of the term "Terra Australis" to geographical nomenclature; the anonymous pamphlet "Copia der Newen Zeytung auss Presillg Landt," of which 10 examples are now known; Maximilianus Transilvanus on the Moluccas, &c.

The maps represent Schöner's Globes of 1520 and 1515, the Western Hemisphere according to Leonardo da Vinci's map of the World; and the Southern Hemisphere according to the map of the World by Orontius Finæus in 1531, and also according to Schöner's 1533 Globe.



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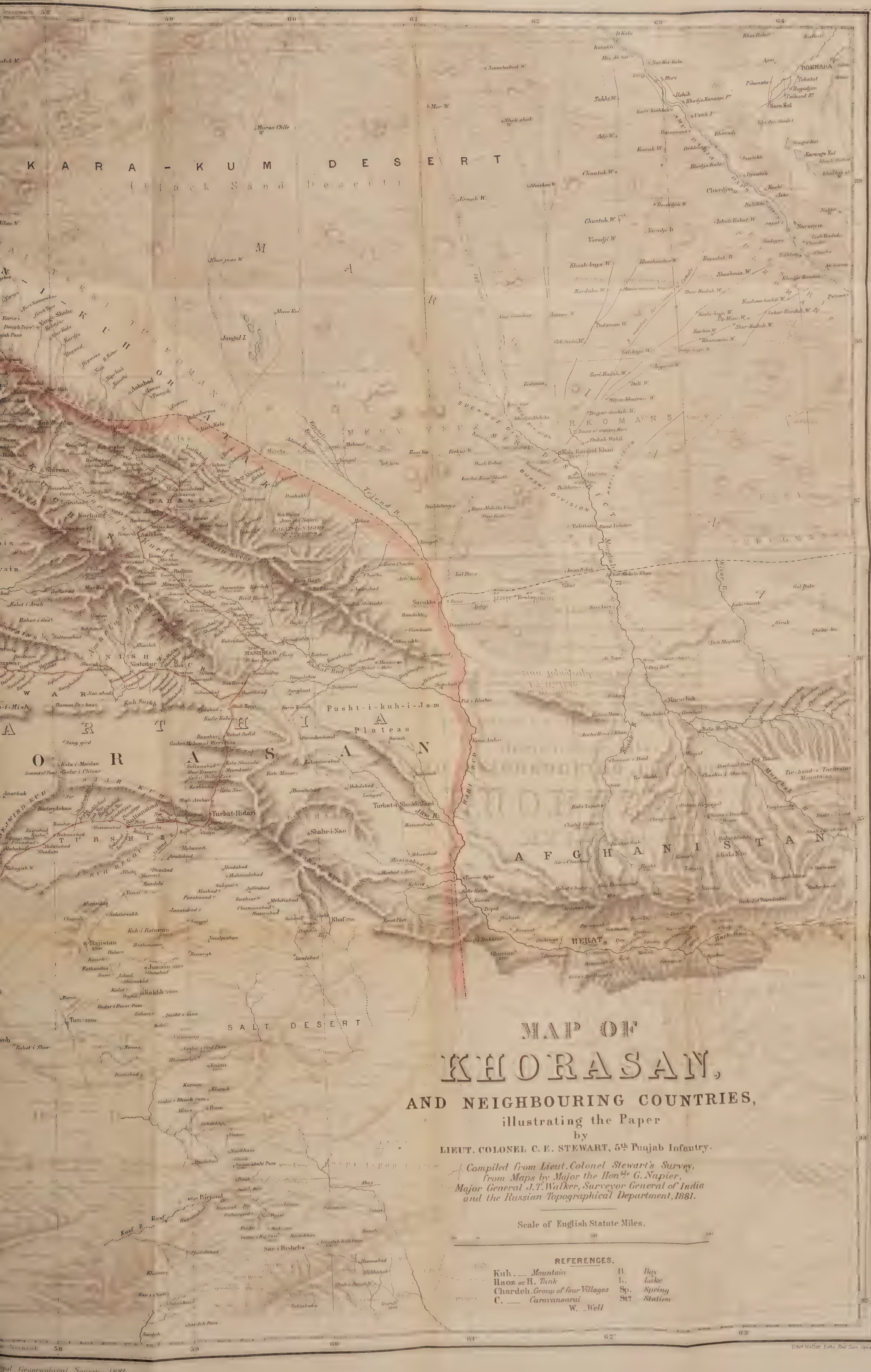

MAP OF KHORASAN,

AND NEIGHBOURING COUNTRIES,

illustrating the Paper
by
LIEUT. COLONEL C. E. STEWART, 5th Punjab Infantry.

Compiled from Lieut. Colonel Stewart's Survey, from Maps by Major the Honble G. Napier, Major General J.T. Walker, Surveyor General of India and the Russian Topographical Department, 1881.

Scale of English Statute Miles.

10 0 50 100

REFERENCES.

Kuh. — *Mountain*
Haoz or H. *Tank*
Chardeh. *Group of four Villages*
C. — *Caravansarai*
B. *Bay*
L. *Lake*
Sp. *Spring*
Stn *Station*
W. — *Well*

yal Geographical Society, 1881.

Edwd Weller Litho Red Lion Square

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

On the Commercial Importance of Hudson's Bay, with Remarks on Recent Surveys and Investigations.

By Robert Bell, M.D., F.G.S., Assistant Director of the Geological Survey of Canada.

Map, p. 640.

I beg leave to offer to the Royal Geographical Society a few remarks on the great Mediterranean sea of North America, in regard to which there appears to be a general want of correct information. Before proceeding to do so, it may be proper for me to state that I have a considerable personal knowledge of Hudson's Bay and the surrounding regions. As an officer of the Geological Survey of Canada, I have spent six seasons since 1869 in explorations around the bay itself or in its vicinity, while the remaining summers of this interval have been devoted mostly to surveying and exploring portions of the Hudson's Bay territory at greater or less distances inland. In the course of my geological investigations, I have made surveys of most of the principal rivers, together with their larger branches, which flow from the west and south into Hudson's Bay, including the Great and Little Churchill, the Nelson, Hayes, Hill, Severn, Albany, Kenogami, Moose, Missinabe, Mattagami, and Abittibi. On account of its great geological interest, I made a topographical survey in 1877 of about 300 miles of the Eastmain Coast, from Cape Jones northward. Some of the maps showing these surveys have been already published with the annual reports of the Geological Department, and those representing the remainder will soon be forthcoming.

During the past autumn, in coming to England in one of the ships from the bay, I happened to enjoy unusually good opportunities of seeing both sides of Hudson's Strait, and of acquiring much valuable information in reference to its navigation.

In the popular mind, Hudson's Bay is apt to be associated with the polar regions, yet no part of it comes within the Arctic circle, and the southern extremity is south of the latitude of London. Few people have any adequate conception of the extent of this great American sea. Including its southern prolongation, James' Bay, it measures about 1000 miles in length, and it is more than 600 miles in width at its northern part. Its total area is approximately 500,000 square miles, or upwards of half that of the Mediterranean Sea of the old world. It is enclosed by the land on all sides except the north-east, where it communicates by several channels with the outer ocean. The principal or best known of these is Hudson's Strait, which is about 500 miles in length, and has an average width of about 100 miles.

Hudson's Bay, which might have been more appropriately called Hudson's Sea, is the central basin of the drainage of North America. The limits of this basin extend to the centre of the Labrador peninsula, or some 500 miles inland on the east side, and to the Rocky Mountains, or a distance of 1300 miles on the west. The Winnipeg Basin constitutes a sort of outlier of the region more immediately under notice, since the waters drain into it from north, south, east, and west, and discharge themselves by one great trunk, the Nelson river, into Hudson's Bay. The southernmost part of this basin, namely, the source of the Red River, extends down nearly to latitude 45°. The head waters of the southern rivers of James' Bay are not far to the north of Lake Huron; while one of the branches of the Albany rises within 25 miles of the north shore of Lake Superior. Including the Winnipeg system, the basin of Hudson's Bay has a width of about 2100 miles from east to west, and a length of about 1500 miles from north to south, and its dimensions approach the enormous area of 3,000,000 square miles. Over a great part of this vast region there is a temperate climate, and although much of the surface is comparatively barren, yet large tracts possess a very fertile soil. The numerous large rivers and lakes embraced within these limits will prove of great value in the settlement of the country.

Both the bay and strait are remarkably free from rocks and shoals, which might interfere with their free navigation. The groups of islands near the east side of the bay are surrounded by deep water, and a wide channel leads up the centre of James' Bay. Fortunately the main body of the bay, which is the portion likely to be hereafter frequented by shipping, is entirely without shoals, reefs, or islands. The depth is very uniform over most of the bay, and nowhere does it present any great irregularities. It averages about 70 fathoms throughout, deepening to 100 and upwards in approaching the outlet of Hudson's Strait; while in the strait itself the soundings along the centre vary from about 150 to upwards of 300 fathoms. The bottom appears to consist almost everywhere of boulder clay and mud. Near the shores a stiff clay, affording good holding ground for anchors, is almost invariably met with on both sides.

James' Bay begins at Cape Jones on the east side and Cape Henrietta

Maria on the west, and runs south about 350 miles, with an average breadth of about 150 miles. The east side of Hudson's Bay, including its southern prolongation, is known as the Eastmain Coast. Between Cape Jones and Cape Dufferin on the Portland Promontory, and again in approaching Cape Wolstenholme, at the northern termination of this coast, the land is high and bold, some parts attaining an elevation of nearly 2000 feet above the sea. The country on the south-west side of the main bay, as well as that lying to the west of James' Bay, is low and generally level, with shallow water extending a long distance out from shore. Both sides of Hudson's Strait are high and rocky, but the northern is less precipitous than the southern.

Of the numerous rivers which run into Hudson's Bay from all sides, about thirty are of considerable magnitude. All those which enter on the Eastmain Coast appear to flow with a uniform course directly west or parallel to one another, and as the height of land in the centre of the Labrador peninsula is furthest inland towards the south, the rivers which fall into the southern part of this coast are the largest, and the remainder become progressively smaller as we go north. Numerous streams converge to the head of James' Bay from all points southward of an east and west line passing through its southern extremity. The Moose, about a mile wide, is the principal of these. On the western side the Albany and the Churchill are the longest, but the Nelson, with a course of only about 400 miles, discharges the greatest body of water into the sea. Indeed, this great artery of the Winnipeg system may be considered as one of the first class rivers of the world. Few of the rivers of Hudson's Bay afford uninterrupted navigation for large vessels to any great distance from the coast. During the season of high water, shallow-draft steamers might ascend the Moose river and two of its branches for upwards of 100 miles. Hayes river and two of its branches might apparently be navigated by such craft in the spring to points about 140 miles inland, and the Albany for nearly 250 miles; while larger steamers might ascend the Nelson for 70 or 80 miles from the open sea. The Nelson is the only muddy-water river entering Hudson's Bay. Most of the others have a slightly brownish tinge, but their waters are perfectly wholesome and contain only very small quantities of foreign matter. The Churchill, which is the second largest river of Hudson's Bay, is a beautiful clear-water stream, somewhat larger than the Rhine. It is remarkable for having at its mouth a splendid harbour with deep water and every natural convenience for the purposes of modern commerce.

The only harbours on the west side of Hudson's Bay are those formed by the mouths of rivers, but none of them, with the exception of Churchill Harbour, can be entered by vessels drawing more than ten or eleven feet, and only at high water even by these. The Churchill is unlike all the other rivers in having a deep, rocky, and comparatively narrow mouth, which can be entered with ease and safety by the largest ships at all stages of the tide. On the point at the west side of the entrance of the harbour stands the old Fort Prince of Wales, which is probably the largest ruin in North America. Although occupying a commanding position and mounting about forty large guns, it was surrendered, without firing a shot, to the French Admiral La Pérouse, who destroyed it in 1782.

Along the west coast the rise and fall at spring tides amounts to about 11 or 12 feet, on an average, and is pretty uniform, diminishing somewhat towards the south. It is greatest at the mouth of the Nelson river, where it amounts to about 15 feet. The tides are lower all along the east side of the bay. In Hudson's Strait there is a very good tide, amounting to 38½ feet at Fort Chimo, according to the reports we have received of Acting Staff-Commander J. G. Boulton's reconnaissance during the past summer.

Geologically the basin of Hudson's Bay, excluding the western or Winnipeg division, lies within the great Laurentian area of the Dominion. Silurian rocks resting almost horizontally upon these, form an irregular border along the south-western side of the bay, and in the valleys of some of the rivers they extend inland from 100 to 200 miles. To the south and west of James' Bay, the Silurian are overlaid by Devonian rocks, which here occupy a considerable area. The long chains of islands which fringe the east coast for nearly 300 miles to the northward of Cape Jones, and also the mainland in the vicinity of Richmond Gulf, are composed of igneous and almost unaltered sedimentary rocks, resembling the Nipigon series of the Lake Superior region, which may be of Cambrian age. On the western side of the bay, from Churchill northwards, quartzites and other rocks, which may also belong to the Cambrian system, appear to be largely developed. Valuable minerals may be looked for on this part of the coast. The extensive level region around the south-western side of the bay is overspread with a great sheet of boulder clay, which is generally covered by the modified drift. The rocks of the outlying, or Winnipeg division of the basin, comprise an extensive series, ranging from the Laurentian to the tertiary.

The resources of Hudson's Bay and the country immediately around it are varied and numerous, although as yet few of them are at all developed. The fur trade is the principal and best known business which has hitherto been carried on in these regions, but a large amount of oil, derived from the larger whales, the porpoises, walruses, white bears, and the various species of seals which frequent the northern parts of the bay, has been carried to New England, and small quantities, principally of porpoise and seal oil, have from time to time been brought to London by the Hudson's Bay Company. The other exports from the bay have been as yet but trifling. They embrace whalebone, feathers, quills, castorum, lead ore, sawn lumber, ivory, tallow, isinglass, and skins of seals and porpoises. The fisheries, properly speaking, of Hudson's Bay have not yet been investigated. Both the Indians and Eskimo find a variety of fish for their own use, and fine salmon abound in the rivers of Hudson's Strait; and from one or two of them a considerable number of barrels, in a salted condition, are exported every year. Waterfowl are very numerous on both sides of the bay, and larger game on the "barren grounds" in the northern parts, so that the natives, with prudence, may always have a plentiful supply of food.

But perhaps the most important of the undeveloped resources of the country around the bay are its soil, timber, and minerals. To the south and west of James' Bay, in the latitude of Devonshire and Cornwall, there is a large tract, in which much of the land is good and the climate sufficiently favourable for the successful prosecution of stock and dairy farming. A strip of country along the east side of James' Bay may also prove available for these purposes. To the south-west of the wide part of the bay the country is well wooded, and although little or no rock comes to the surface over an immense area, still neither the soil nor the climate are suitable for carrying on agriculture as a principal occupation until we have passed over more than half the distance to Lake Winnipeg. This region, however, offers no engineering difficulties to the construction of a railway from the sea-coast to the better country beyond, and this, at present, is the most important point in reference to it. Some of the timber found in the country which sends its waters into James' Bay, may prove to be of value for export. Among the kinds which it produces may be mentioned white, red, and pitch pine, black and white spruce, balsam, larch, white cedar, and white birch. The numerous rivers converging towards the head of James' Bay offer facilities for "driving" timber to points at which it may be shipped by sea-going vessels.

Minerals may, however, become in the future the greatest of the resources of Hudson's Bay. Little direct search has as yet been made for the valuable minerals of these regions. I have, however, found a large deposit of rich ironstone on the Mattagami river, inexhaustible supplies of good manganiferous iron ore on the islands near the Eastmain coast, and promising quantities of galena around Richmond Gulf and also near Little Whale River, where a small amount had previously been known to exist. I have likewise noted traces of gold, silver, molybdenum, and copper. Lignite is met with on the Missinabe, gypsum on the Moose, and petroleum-bearing limestone on the Abittibi river. Small quantities of anthracite, and various ornamental stones and rare minerals, have been met with in the course of my explorations. Soapstone is abundant not far from Mosquito Bay, on the east side, and iron pyrites between Churchill and Marble Island, on the west. Good building stones, clays, and limestones exist on both sides of the bay. A cargo of mica is said to have been taken from Chesterfield Inlet to

New York, and valuable deposits of plumbago are reported to occur on the north side of Hudson's Strait. Some capitalists have applied to the Canadian Government for mining rights in the latter region.

Situated in the heart of North America, and possessing a seaport in the very centre of the continent, 1500 miles nearer than Quebec to the fertile lands of the North-west Territories, Hudson's Bay now begins to possess a new interest, not only to the Canadians, but also to the people of Great Britain, from the fact that the future highway between the great North-west of the Dominion and Europe may pass through it. The possibility of this route being adopted for trade is not a new idea, as it has frequently been suggested by far-seeing men in past years, and occasionally referred to in the newspapers. In 1848 the then Lieutenant M. H. Synge, in his work on Canada, wrote: "A ship annually arrives at Fort York, for the service of the Hudson's Bay Company; who can tell how many may eventually do so?" In 1869, and subsequently, I frequently discussed the matter with the late Hon. John Young, Mr. Keefer, Professor Armstrong, and others; and in 1876 Mr. Selwyn brought the subject unofficially before members of the Canadian Government, and recommended that surveys be made of Hudson's Bay and Strait. The Right Hon. Sir John A. Macdonald, Minister of the Interior, and his deputy, Colonel J. S. Dennis, have all along taken a deep interest in this question, and in 1878 the latter gentleman published a work, accompanied by a valuable map, in relation to it. The Report of the Minister of the Interior for 1878 contains an appendix by myself on the practicability of building a railway from Lake Winnipeg to Hudson's Bay. In the session of 1878–79, and again the following year, the Hon. Thomas Ryan, a gentleman of great enterprise, has brought the matter under the notice of the Dominion Senate.

In 1880 the Parliament of Canada granted charters to two companies for constructing railways, and otherwise opening a route for commerce, from the North-West Territories to Europe viâ Hudson's Bay; and during the past summer one of them, the Nelson Valley Company, caused a survey to be made of part of the distance between Lake Winnipeg and the harbour of Churchill. Their chief engineer has reported the route to be an easy and inexpensive one for a railway. This company has also the power of connecting with the Canadian Pacific Railway, but the main line will form a connecting link between the great system of inland navigation, which centres in Lake Winnipeg, and the sea. When constructed, the Nelson Valley railway may carry to the seaboard not only the surplus grain and cattle of our own North-West, but also those of Minnesota and Dakota. Sir J. H. Lefroy, President of the Geographical Section of the British Association, in the able address which he delivered at the Swansea meeting (1880), said:—"Hudson's Bay itself cannot fail, at no distant day, to challenge more attention. Dr. Bell reports that the land is rising at the rate of five to ten feet in a century, that is, possibly, an inch a year. Not, however, on this account will the hydrographer notice it; but because the natural seaports of that vast interior, now thrown open to settlement, Keewatin, Manitoba, and other provinces unborn, must be sought there. York Factory, which is nearer Liverpool than New York, has been happily called by Professor H. Y. Hind the Archangel of the West. The mouth of the Churchill, however, although somewhat further north, offers far superior natural advantages, and may more fitly challenge the title. It will undoubtedly be the future shipping port for the agricultural products of the vast North-West Territory, and the route by which emigrants will enter the country." Sir Henry Lefroy knows whereof he writes, being personally well acquainted with Hudson's Bay and the North-West Territories.

It has been shown that the Canadian North-West Territories, embracing hundreds of millions of acres of fine land, are capable of becoming the greatest wheatfield in the world. The centre of this immense agricultural region probably lies to the north of the Saskatchewan. If we look at the map of the northern hemisphere, we shall see at a glance that the shortest route between these territories and England is through Hudson's Bay. Mr. Lindsay Russell, the Surveyor-General of Canada, has recently made a close calculation of relative distances, and found that even the city of Winnipeg, which is near the south-eastern extremity of these territories, is at least 800 miles nearer to Liverpool by the Hudson's Bay route than by the St. Lawrence, while the difference in favour of the former will be increased continually as we advance northward into the interior. Now let us consider the relative progress of two persons travelling to Liverpool from the centre of this vast region, the one going by Winnipeg and the valley of the St. Lawrence, and the other by the Nelson valley and the Churchill Harbour. In about the same time which the former requires to reach the city of Winnipeg, the latter arrives at the sea-coast at Churchill. From Winnipeg our first traveller has still to go 1291 miles by the Lake Superior route, or 1698 miles if he prefer the all-rail journey through American territory, viâ Chicago, before he reaches Montreal, where he will be still about as far from Liverpool as our other traveller when he has reached Churchill. In other words, the route from the North-West Territories to England, viâ Hudson's Bay, saves the whole distance between Winnipeg and Montreal. The distance to Liverpool by way of New York is still greater. The advantages of this short route over all others are so numerous that only a few of them can be referred to in this short paper. The great saving in distance represents an important economy in time and money, or in freight and passenger rates. If the grain, cattle, and other productions of the North-West Territories could reach a European market, only through Ontario and Quebec, or by way of New York, a large proportion of their value would necessarily be consumed by the long land carriage; whereas if they can find an outlet at Churchill, there will be an average saving of 1291 miles as compared with Montreal, and of upwards of 1700 miles as compared with New York, and this without any increase in the length of the sea voyage. In effect, this will place a great part of the farming lands of our North-West Territories in as good a position in regard to a seaport as are those of Ontario west of Toronto; and consequently will greatly increase the value of every description of farm produce and, therefore, of the farms themselves. Some kinds, which could not be sent out of the country at all by the longer land route, may be profitably exported by the shorter one. For the transportation of both grain and fresh meat, as Colonel Dennis has pointed out, the northern route, besides the shortening of the distance, would have great advantages over all those to the south, owing to its cooler and more uniform temperature. Heavy or bulky goods of all kinds would, of course, be imported into the North-West by the shortest land route. In regard to the export and import of live stock, this independent route will possess a great importance to these territories. Hitherto cattle, horses, hogs, and sheep have there enjoyed an immunity from almost all forms of contagious diseases, and, owing to the healthy nature of the climate for these animals, it is hoped this state of things will continue. The domestic animals in the United States and the older Canadian provinces being occasionally afflicted with contagious diseases, it becomes necessary for European countries to impose restrictions on their importation. In the event of an epidemic of this nature existing in some part of these regions, but not in the North-West Territories, there need be no objection to exporting live stock from the latter by way of Hudson's Bay.

As a route for emigrants from Europe, that by Hudson's Bay possesses not only the advantage of the short land journey, but the still more important one to us, of entirely avoiding the United States and the populous parts of Canada, in both of which, it is well known, a very serious percentage of the immigrants destined for our North-West lands are every year enticed away to settle in the great republic. An inlet by Hudson's Bay is the only thoroughly independent channel which can ever be established between the British Islands and our great and valuable territories in the interior of North America; and it is very desirable, on national grounds, that it should be opened up. Troops have hitherto been sent to the Red River settlement on more than one occasion, by way of Hudson's Bay, while the intervening country was, as it is yet, in a state of nature. Were a short railway built through this tract, it would at once become, for military purposes, an easy connecting link with the mother country.

An impression has long prevailed that Hudson's Bay and Strait could not be navigated for the ordinary purposes of commerce on account of ice, but this idea is probably destined to prove chimerical. The occasion for testing the point had not hitherto arisen, and the fact that these waters have been successfully navigated by ordinary sailing vessels for 200 years, in order to secure what little trade the country afforded, indicates what may be expected from properly equipped steamships, so soon as the larger business of the future may require their services in this direction. The conditions of the sea-borne commerce of the North-West, in relation to Hudson's Bay, will probably turn out to be similar to those of the rest of Canada with reference to the Gulf of St. Lawrence. In both cases, everything must be done during the summer. Yet Hudson's Bay is, of course, open all the year round. No one would be likely to suppose that a sea of such extent, in the latitude of the British Islands, would ever freeze across. The Lower St. Lawrence is also partly open even in the middle of winter. But the difficulty in both cases is the impossibility of getting into harbours. A harbour such as that of Churchill on Hudson's Bay would have the advantage over Quebec or Montreal of communicating directly with the open sea, and hence in the autumn, vessels would not be liable to be frozen in, as occasionally happens in the St. Lawrence, as for example in the autumn just passed; and also in the autumn of 1870, when the outward-bound shipping got frozen in below Quebec, occasioning a loss, it was said, of over a million of dollars. Again, in the spring there would probably be less uncertainty about entering from sea than in the Gulf of St. Lawrence, where vexatious delays are not uncommon after the open season is supposed to have arrived.

There has been some discussion as to the length of time during which Hudson's Strait and Bay might be navigated each year, but there does not seem to be much evidence that the strait, any more than the bay, is closed at any season. Its great width, depth, and the strength of the tides probably keep it open all winter. My own experience and that of many others lead me to believe that the climate generally of Hudson's Bay is much better than some writers have represented it to be. From all that I could learn or observe, it appears that the strait and bay may be navigated and the land approached by steamers during an average of four and a half months each year, or from the middle of June to the end of October. The strait and bay could probably be navigated by steam-vessels earlier than the middle of June, but nothing would be gained, except perhaps by whalers, in going in before an open harbour can be reached. Much has been recorded in favour of the above opinion from the days of the Danish Captain John Monck, who wintered at Churchill in 1619–20, to the present time; and other evidence, which is not to be found in the books, leads me to the same conclusion. Churchill Harbour does not freeze up until November, and the sea is open close to it during the whole winter.

I have a record of the principal phenomena of the seasons at Martin's Falls, on the Albany, extending through a period of fifty years, and from it I find that the river is open there on an average for six months of the year. I have also a record of the dates of the opening and closing of Hayes river at York Factory, extending over more than fifty years, from which it appears to enjoy an average of fully six months of open water. The Nelson river is open for a longer period. I think, with these facts before us, we need not despair of successfully navigating Hudson's Bay, as far as the length of the season is concerned. Even were the time of open navigation shorter than it is known to be, the very great benefits which the North-West and Canada generally would derive from possessing an outlet in that direction, are sufficient to make it well worth an effort to open it up. The freedom of Hudson's Strait and Bay from rocks, shoals, and other impediments to navigation will exempt vessels in that quarter of the globe from the heavy expenses for pilots, lighthouses, &c., which burden shipping by the St. Lawrence, and are even more onerous in some other parts of the world. The delays from drifting ice in the strait which have occasionally occurred to sailing vessels would not be experienced by steamships.

We have seen that in proportion as we decrease the cost of transportation to a foreign market, we increase the home value of all kinds of farm produce, and consequently of the farm itself. Now, considering the vast extent of fine land to be affected by the opening of the route above referred to, if the value of each acre of it were enhanced in this way by only a few shillings, the aggregate increase would amount to more than a hundred millions of dollars. Such a gain as this, together with the various other great advantages which, as we have seen, may be derived from the opening of this new ocean route, will, I think, sufficiently illustrate the commercial importance of Hudson's Bay.

GEOGRAPHICAL NOTES.

Arrival of the American Polar-Station Party at Lady Franklin Bay.—News has been received of the safe arrival of Lieut. A. W. Greely and his party,* on the 11th of August at Lady Franklin Bay. They were taken up Smith Sound and left at their destination by the steamer *Proteus*, belonging to Mr. James Stewart, M.P. for Greenock, which arrived on its return voyage at St. John's, Newfoundland, on the 12th of September. On her way to the north the *Proteus* put into Godhavn on July 16th, and took in, for the use of the expedition, twelve dogs, two sledges, 1500 lbs. of dried fish, and twelve barrels of walrus meat. At Disco, Dr. Pavy, who had passed the winter there, joined the expeditionary party. The *Proteus* reports that last winter was very mild in that part of the North Polar basin, and that the ship could have penetrated further north, there being open water as far as the eye could reach. A contrary state of things appears to have prevailed this summer in the Arctic Seas further east. The Dutch Arctic exploring vessel *Willem Barents* has found Spitzbergen, Novaya Zemlya, and even the Bear Islands unapproachable on account of the barrier of Polar ice which surrounds them; and we further learn that the ice has been permanent this year within ten miles of the northern coast of Iceland. At Godhavn, whence we have news up to September 2nd, sickness of an epidemic nature had been very prevalent among the natives, and many had died.

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* Proceedings R. G. S., *ante*, p. 484.

Events in East Central Africa.—By recent despatches from Zanzibar we learn that the enterprising chief Mirambo has returned from a warlike expedition he has made, during the early part of the present year, to the regions north and east of his dominions, in the course of which he is said to have reached the southern shores of Victoria Nyanza. Besides securing the usual plunder in cattle and slaves for himself and his warriors, he is said to have entered into friendly relations with King Mtesa with a view to opening up a western trade route, a necessary preliminary to which would be the domination of the independent and powerful tribes lying between the territories of the two chiefs. Should the nefarious project succeed it is expected to have at least the beneficial effect of opening up a safer and a cheaper road, west of Victoria Nyanza, to European travellers. King Mtesa is said to have become for the time more friendly to the English missionaries, since the return of the native envoys from their journey to England and the receipt of the presents from the Queen. The Rev. Mr. O'Flaherty and Mr. Mackay were in Uganda; the former, in crossing the lake, had attempted to land at Bambiré Island, the scene of Mr. Stanley's hostile encounters, but he and his party were received by the natives with a discharge of poisoned arrows. He says, "the beautiful and numerous islands of this part of the lake have had their inhabitants all massacred or taken into slavery by Mtesa's forces for having assaulted his men when they wished to land."

Proposed Expedition to Mounts Kenia and Kilimanjaro.—The Council of the British Association, at the York meeting, on the recommendation of various Sections, passed a resolution in favour of an expedition for the scientific exploration of the snowy range of Eastern Equatorial Africa. The Council of the Royal Geographical Society is to be addressed on the subject, and 100*l.* offered by the Association towards the expenses of the expedition.

Mr. J. M. Schuver's African Expedition.—At the beginning of the present year Mr. J. M. Schuver, who had previously undergone the course of scientific instruction for travellers provided by the Council of the Society, left Cairo with the reported intention of crossing the continent of Africa from north to south. In due time he reached Khartum and afterwards Fazogl, whence he started on an excursion to the south preliminary to his journey through the Galla country after the rainy season is over. We have been informed by Mr. H. Scarborough, of Paris, that the latest letter received from Mr. Schuver is dated May 22nd, and was written from Beni Shongul on his way to Fadasi, near the Yabos affluent of the Blue Nile, in about E. long. 35° 10′, N. lat. 9°, so that he would appear to be following approximately M. Marno's route of 1870. As the country is impracticable for camels, Mr. Schuver had provided a few donkeys for baggage animals, and he proposed to remain in the Berta country until the weather enabled him to return to Fazogl, in order to collect his arms, ammunition, and other baggage previous to making his final start. Mr. Schuver is known to be an accomplished linguist, and he will, no doubt, have obtained some acquaintance with the language of the Galla country, a native of which is now travelling with him. In this stage of his great journey, Mr. Schuver's chief objects are stated to be the determination of the sources of the Sobat and the discovery of the lakes which are believed to exist on the high plateau between the White Nile and Kaffa. Having achieved this part of his self-imposed task, Mr. Schuver will proceed to the Victoria Nyanza. In the letters which have been received from him, he says that his sympathies are entirely with the Gallas, who offer a type of physical strength and beauty, coupled with a high order of intelligence and a delicacy of sentiment, which makes him strongly desire to become thoroughly acquainted with them. It is probable that Mr. Schuver will finally leave Fazogl in November, and in the meantime he has, we are informed by a friend of his, established a dromedary post between Khartum and his headquarters.

The Colony of Trek-Boers in Angola.[*]—Towards the end of last year the Trek-Boers in Damara-land, to whose position we referred [†] in May 1880, crossed the river Cunene, and applied for a grant of land to the Portuguese Governor of Mossamedes. The party, some 300 in all, arrived at Huilla on December 20th, and about a week afterwards the Governor, Senhor Sebastião Nunez da Matta, signed an engagement with their leader, Mr. F. J. Botha, assigning them 7500 acres of the uncultivated lands of Humpata (about S. lat. 15°), to the east of the Serra de Cheria and between it and the Serra da Munda. The colony of Boers settled there is named São Januario, after the Portuguese Minister of the Colonies, the Visconde São Januario. When the colony is considered to be satisfactorily established, each family will receive an extensive allotment of ground in the neighbourhood. An arrangement appears to have been entered into, whereby the Boers will be allowed the free exercise of their religion, while at the same time they undertake to submit to Portuguese law. In order that protection may be near at hand to this colony, which promises to be of so much importance for the future development of agriculture in this region, the fort of Huilla is to be rebuilt as soon as possible. An irrigation canal was commenced in January last, and completed by February 20th; it is between 3 and 4 miles long, some 5 feet broad and 3¼ feet deep, and is filled from the Rio Neve and Rio Canhanda, which are connected through the Cacolovar with the Cunene.

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[*] See 'Boletim da Sociedade de Geographia de Lisboa.' Second Series, No. 1, p. 304.

[†] See vol. ii. p. 316.

Indian Marine Surveys.—One of the principal events of the year 1879–80 in the Marine Survey Department was Captain Taylor's inspection of the chief lighthouses and ports along the Indian coasts. Many interesting items were noted during this tour, among which may be mentioned the fact that the Cruz Milagre Gap near Cochin, where the sea made a breach some ten years since, has now been closed by the local engineers, and that in consequence there is more than one foot greater depth on the bar of Cochin. Captain Taylor was gratified to find that at Paumben the port officer had done good work with the dredger *Albuquerque*, and that a depth of 16 feet had been obtained across the horseshoe sandbank. He adds that if more energetic measures were taken by the Public Works Department to cut through the rocky dam, we might soon see vessels with a draught of 14 or 15 feet making seasonable use of the Paumben Pass. Inquiry has been made in Parliament about the progress of these works, and we may therefore expect to see them pushed forward with greater energy. In the opinion of some competent authorities, the saving in the direct route which obviates the circuit of Ceylon, for vessels proceeding to Madras or along the coast, would pay the interest on the capital expenditure of a ship-canal of fair dimensions. The chief surveys completed during the year by the officers of the department consist of Karwar Bay or Sadashwgad (15½ square miles of water and 25 miles of coast-line), the soundings extending to about 4½ miles off shore; the north approach to Prince's Dock, Bombay; Bankot and Marmagao. The last named port was also inspected by Captain Taylor, who places on record some tolerably strong opinions against the likelihood of its developing into a place of commercial importance. He points out that Panjim is much better adapted for trade, being a central point upon which numerous rivers, creeks, and inland waterways converge, and a considerable export and import trade already exists there, while even with the proposed breakwater the depth of water in Marmagao harbour would be insufficient, unless an expenditure of something like a quarter of a million sterling were incurred. Karwar, on the other hand, has a magnificent natural external breakwater (the Oyster Rocks) well lighted, and behind which vessels can run and anchor in perfect shelter at any time of the night and at any season of the year. In the Appendix to Captain Taylor's Report we find a valuable list of the various alterations needed in regard to Indian lights, which will no doubt commend themselves to the local governments on whom the charge of lights and lighthouses devolves. Captain Taylor concludes with the characteristic remark that the many wrecks which have of late years occurred round the coasts of India, in spite of the multiplication and improvement of lights, have been owing to the neglect of the lead, the increased number of lights seeming only to make navigators less careful. Not only are lights multiplied, but the charts of the coast are so much improved of late years that there is little excuse for vessels running into danger without warning.

A British Traveller at Hami.—The Hong Kong *China Mail* has just received a letter from a correspondent of theirs who has been travelling through North-Western China and has succeeded in reaching Hami, on the further side of the Great Gobi desert. Sosnofsky and Prejevalsky have visited Hami within the last few years, but we are not aware that any British traveller has ever yet been so far. The most remarkable thing about this correspondent, who simply signs himself "Pioneer," is that he says he is making his way without money or equipment of any pretension, but that he has encountered no great difficulties, and finds the native Turks of Hami, though easy-going in their observance of Mahommedan customs, a quiet, frugal, and industrious people. "Pioneer" does not give any indication of his future movements, but we presume he contemplates journeying on to Kuldja.

The Principality of Loochoo.—The Foreign Office has lately communicated to the Society of Arts * an exceedingly interesting report on the principality of Loochoo, which was drawn up by Mr. John A. Gubbins, of Her Majesty's Consular Service in Japan, at the suggestion, we believe, of our Associate, Sir Harry S. Parkes. The greater part of this elaborate and valuable memoir is, of course, not geographical in its nature, but there are portions which furnish information useful to the geographical student. At the outset Mr. Gubbins corrects a common mistake, made even by foreigners in the Far East, of including in the principality of Loochoo—which for so long has been in an anomalous state of autonomy and subjection to both China and Japan—the whole of those islands known to navigators as the Loochoo group. The northern islands, we are reminded, of which the chief are Oho-sima, Yarabu-sima, and Kikai-sima, have been Japanese possessions for nearly 300 years, and at a comparatively recent date another small island was added to the number. Loochoo Proper consists of the large island of Okinawa-sima and nine outlying groups, with some smaller islands more or less distant. The population of the principality in 1875 was said to be 165,930, and the people may be roughly divided into two classes, Shizoku and Heimin—a distinction borrowed from Japan. The inhabitants of the main island, 117,316 in number, are very unequally distributed, more than half being included in the four towns, which are also distinguished from the rest of the country by the fact that their population consists almost entirely of Shizoku. The island of Okinawa has three large geographical divisions, which are subdivided into thirty-five *magiré* (a term derived from an old land division in Satsuma, according to Mr. Gubbins) or districts, further divided into *mura* or villages.—The following productions of the principality are exported to the value of some 50,000*l.* annually:—Sugar, cotton and other cloth, silk fabric, yellow dye, saké, drugs, umbrellas, rope, &c. Besides these, the products are potatoes, rice, indigo, peas and beans, millet, palms, coral, and cattle.—There is no State religion in Loochoo, but Confucianism, Buddhism, and Shintoism exist side by side.—There are thirty schools, where the course of instruction includes the Chinese classics and Japanese syllabaries, but one particular school is set apart for the teaching of Chinese. Women, however, receive no instruction in reading and writing.—The language of the principality is closely allied to that of Japan, its affinity to the Satsuma dialect being very marked.—The means of intercommunication in Loochoo are of a somewhat primitive character. The roads, on the whole, are described as bad, though the streets of the towns of Shiuri, Nafwa, Tomau, and Kumei are fairly well made, and the paved road from Nafwa to the castle at Shiuri would compare favourably with the better class of roads in Japan, in spite of the irregular way in which some of the stones are laid. In the open country away from the towns the roads become mere tracks, impassable for wheeled conveyances, and the absence of bridges is marked. Produce is transported from place to place either by pack-horses or by coolies of both sexes, the women carrying the loads on their heads, while the men sling them on poles as in China.—Loochooan graves are similar to those in China, but the mode of interment is different. After death the body is placed in a large earthen jar, and deposited in the family vault, where it is left for three years. The jar is then taken out, and the bones, after being washed, are placed in another jar and returned to the tomb. The burial services are conducted according to Buddhist rites.—The division of the people into the Shizoku and Heimin classes has been attended, Mr. Gubbins says, with the worst consequences, having had the effect of enervating the one and degrading the other. The hair-pin is the chief distinction between them, that of the Shizoku being of silver and the Heimin's of brass. There are also other distinctions. The Heimin is not allowed to wear clogs; he must not carry an umbrella as a protection against the sun, though he may use it in wet weather; and he is debarred from using cloth of certain patterns for his clothes. In concluding his notes on this portion of his subject, Mr. Gubbins calls attention to a curious fact in connection with this social division of the people. The men belonging to the Heimin class are, it appears, almost dwarfish in their stature, physical development, and the shape of their limbs, while the Shizoku are, as a rule, fine, big men, and undeniably well made. Moreover, while the former in physiognomy resemble the Chinese, the latter have all the features of the higher classes in Japan. Mr. Gubbins has been informed by a friend that he noticed a similar peculiarity among the inhabitants of Korea.

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* Journal, vol. xxix. p. 598.

Dr. Montano's Visit to North Borneo.—During his recent journey, in company with Dr. Paul Rey, in Malaysia and the Philippine Islands, to which we have before referred, Dr. Montano availed himself of an opportunity to visit North Borneo, landing at Elopura, at the northern extremity of the west coast of Sandakan Bay, where the North Borneo Company have a small station. Having accidentally met with two natives of the previously undescribed Buli Dupi race, which differs essentially in its anthropological characteristics from the Malay, Dr. Montano determined to study them at home in one of their villages on the river Sagaliud, which empties into Sandakan Bay. Even with the aid of Mr. Pryer, the Resident, however, he was only able to hire one small boat, and he was, therefore, obliged to start on this excursion without his companion, Dr. Rey. Dr. Montano describes Sandakan Bay as interspersed with numerous islands and in many places very shallow, but nevertheless vessels of considerable tonnage can navigate its waters without difficulty. The coast is deeply indented, and affords numerous anchoring places; and along the western side of the bay in many parts vessels can approach within a few yards of the shore. The bay can be entered without danger, but owing to the narrowness of the entrance the currents and tides are strong. The whole region appears to consist of sandstone. The west coast is formed of lofty hills covered with forests, and in some parts by perpendicular cliffs, the stratifications of which run from east to west at an angle of 45°. Dr. Montano followed the west coast of the bay until he doubled the western point of Hadji Pulo, an island off the mouth of the Sagaliud. The lofty cliffs were everywhere covered with vegetation, and presented a very picturesque appearance, but scarcely a human being was to be seen anywhere. The mouth of the Sagaliud is wide, but obstructed by a bar, in the middle of which is a passage some 60 or 70 feet broad, with only a depth of 5 feet at low water, but the river rapidly deepens to 20 feet. At the mouth the banks are covered with mangrove trees, which are succeeded by the *nipa* palm-trees, and farther on by forest similar to that on the west coast of the bay. Dr. Montano's voyage up the river was much impeded by his inability to find out the position of the Buli Dupi village, and by his boat frequently getting into small tributary streams before finding the true course of the river. On both banks there rose impenetrable walls of vegetation, without any trace of a human being. After a day and a half the so-called village was reached, and was found to consist of some ten huts scattered along the bank in a small cleared space surrounded by a dense forest. Dr. Montano at once set to work to determine the position of the village of Sagaliud, which he found from three observations to be in E. long. 117° 28′ 44″. He next directed his attention to anthropological observations, and had no difficulty in obtaining six photographs, but the Buli Dupis showed an almost invincible repugnance to being measured. The Buli Dupis are described as having almost European features in some cases, modified in others by evident cross-breeding, but always superior to those of the surrounding Malays and Suluans, to whom they are apparently not inferior in other respects. Dr. Montano is of opinion that the race is rapidly decaying, and it is, therefore, interesting to know that he succeeded in obtaining information as to their past and present condition from some of the villagers who could speak Malay. The Buli Dupis believe that they originally came from an island named Kamiguil to the east of Sandakan, the existence of which, however, is at best doubtful. On the hills of this island, they say, there grows a particular kind of tree called Dupi, not found about Sandakan Bay, and hence comes their name *Orang Buli Dupi* (men of the mountain of Dupi). Formerly they were very numerous and scattered about in many parts of the coast of Borneo, but now they are only found at Sagaliud, at some points on the river Kinobatangan, and at Labuk, to the west of Sandakan Bay. Their language differs considerably from those of the Malays and Suluans.—As the neighbourhood of the village did not offer any facilities for collecting natural history specimens, Dr. Montano resolved to go higher up the river, but after a day's journey he was obliged to abandon the attempt, as he found that, though there was a sufficient depth of water in the river, its course was completely obstructed by enormous trunks of trees, swept down in times of flood. It was equally impossible to advance by land through the impenetrable jungle of the forests. Dr. Montano's reports, from which we obtain these notes, were communicated by the Minister of Public Instruction to the Geographical Society of Paris,* together with his survey of the river Sagaliud. Elopura, which is not marked in our own or the French Admiralty charts, ought, according to Dr. Montano's observations, to be placed in N. lat. 5° 46′ 30″, E. long. 118° 11′ 15″.

Exploration in the Argentine Republic.—Mr. E. O'Connor has addressed a letter to a Buenos Ayres paper on the subject of his ascent of the Rio Negro to the confluence of the Limay and Neuquem, in which he mentions the fact that, with the exception of Villarino, he has been the first to take a vessel to that point. Mr. O'Connor calls attention to the curious fact that the waters of the Limay and Neuquem are separately distinguishable in the bed of the Rio Negro, until it bends, when they become mingled. The Limay is not navigable at present, owing to the numerous rapids which, forming an angle with the banks, prevent the passage of vessels. The waters of the Limay are blue and limpid, and every pebble can be seen in its bed, while those of the Neuquem, which is from 30 to 50 yards broad, are, on the contrary, troubled and muddy. As the result of his observations, Mr. O'Connor states that the Rio Negro is not navigable from February to May, but in June the waters begin to rise with the abundant rains in the Cordilleras. Incidentally he remarks that he and his companions on the voyage, when comparing notes on their explorations in general, arrived at the conclusion that Villarino's so-called "Salto de Mosquitos" does not exist.—It has been decided that the scientific expedition, which the Government had intended to despatch in July, shall not start from Patagones till October, when it will proceed to the port of San Antonio, in the Gulf of Matias. It will make the necessary surveys for the construction of a road and the sinking of wells, in order that drinkable water may be procurable along the whole line of country that is to be traversed. The sum of 1000*l.* has been granted for the purchase of the necessary apparatus in connection with the wells, which are intended to be of a permanent nature.—It is announced that the several expeditionary corps under General Villegas have reached Lake Nahuel Huapi (S. lat. 41° 30′, W. long. 71° 10′—1762 feet above sea-level). One of the corps under Colonel Winter followed the line of the Limay, while the Neuquem division descended the Andine slopes to the lake. Much geographical information may be expected from the official reports of the various divisions of this expedition.—Dr. Adrian has offered to make a journey of exploration in the Gran Chaco, if the National Government will furnish him with a guard of twenty-five soldiers, and he would return by the end of the year.

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* See *Bulletin*, August 1880 and March 1881.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

JUBILEE MEETING, YORK, 1881.

THE British Association for the Advancement of Science held its fifty-first annual meeting, this year at York, from the 31st of August to the 7th of September. Being the fiftieth anniversary of the Association, the occasion was celebrated as the jubilee gathering, and the proceedings, to a great extent, took the form of retrospective reviews of the progress of Science in its different branches since the year of foundation. The Geographical Section was organised as follows:—

PRESIDENT:—Sir J. D. Hooker, K.C.S.I., C.B., M.D., D.C.L., LL.D., F.R.S., V.P.L.S.

VICE-PRESIDENTS:—Sir Alexander Armstrong, K.C.B., F.R.S.; Professor I. Bayley Balfour; Francis Galton, M.A., F.R.S.; C. R. Markham, C.B., F.R.S.; Admiral Sir E. Ommanney, C.B., F.R.S.; Sir Richard Temple, Bart., G.C.S.I.; Professor Sir Wyville Thomson, D.SC., F.R.S.

SECRETARIES:—J. W. Barry; H. W. Bates, F.R.S., Assistant Secretary R.G.S. (*Recorder*).

COMMITTEE:—General Sir J. E. Alexander; W. T. Blanford, F.R.S.; Commander V. L. Cameron, R.N.; Edward Easton; the Bishop of Edinburgh; Sir Walter Elliot, F.R.S.; Cecil G. S. Foljambe, M.P.; Captain W. Gill, R.E.; F. Ducane Godman; Colonel H. H. Godwin-Austen, F.R.S.; James Glaisher, F.R.S.; Colonel J. A. Grant, C.B., F.R.S.; T. Hailstone; Lord Houghton; Rev. F. Lawrence, B.A.; Rev. H. Lansdell; Sir Charles Nicholson, Bart.; Professor A. Newton, M.A., F.R.S.; Captain Bedford Pim, R.N.; Dr. J. S. Phené; Lord Reay; G. F. Rodwell, M.A.; Dr. Rollitt; A. O. Rutson; Osbert Salvin, F.R.S.; P. L. Sclater, F.R.S.; H. Seebohm; Trelawny Saunders; Sir Harry Verney, Bart.; Captain E. H. Verney, R.N.; A. R. Wallace; Rev. Horace Waller.

Thursday, September 1*st.*

The President opened the proceedings of the Section by the following Address:—

It has been suggested that a leading feature of the sectional addresses to be delivered on the occasion of this, the fiftieth anniversary of the meetings of the British Association, should be a review of the progress made during the last half century in the branches of knowledge which the sections respectively represent.

It has further been arranged that, at so auspicious an epoch, the sections should, where possible, be presided over by past Presidents of the Association. This has resulted in almost every sectional chair being occupied by a President eminent as a cultivator of the science with which his section will be engaged, though not the one I have the honour of filling, which, from the fact of there being no professed geographer amongst the surviving past Presidents, has been confided to an amateur.

Under these circumstances I should be untrue to myself and to you, if I presumed to address you as one conversant with geography in any extended signification of the word, or if I attempted to deal with that important and attractive branch of it, topographical discovery, which claims more or less exclusively the time and attention of the geographers of this country. It is more fitting for me, and more in keeping with the objects of this Association, that I be allowed to discourse before you on one of the many branches of science the pursuit of which is involved in the higher aims of geographers, and which, as we are informed by an accomplished cultivator of the science, are integral portions of scientific geography.* Of these none is more important than that of the distribution of animals and plants, which further recommends itself to you on this occasion from being a subject that owes its great progress during the last half century as much to the theories advanced by celebrated voyagers and travellers as to their observations and collections.

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* Major-General Strachey, in a lecture delivered before the Royal Geographical Society ('Proceedings,' vol. xxi. p. 179, 1877) discusses with just appreciation and admirable clearness, the interdependence of the sciences which enter into the study and aims of scientific geography, and which he enumerates under fourteen heads. This lecture contains the ablest review of the subject known to me. It might very well be entitled 'The whole duty of the Geographer.' Every traveller's outfit should include a copy of it, and one should accompany every prize given by the Geographical Society to students for proficiency in geographical knowledge.

Before, however, I proceed to offer you a sketch of the progress made during the lifetime of the Association in this one branch, I must digress to remind you, however briefly, of the even greater advances made in others, in many cases through the direct or indirect instrumentality of the Association itself, acting in concert with the Royal and with the Royal Geographical Societies.

In topography the knowledge obtained during this half century has been unprecedentedly great. The veil has been withdrawn from the sources of the Nile, and the lake systems of Central Africa have been approximately localised and outlined. Australia, never previously traversed, has been crossed and recrossed in various directions. New Guinea has had its coasts surveyed, and its previously utterly unknown interior has been here and there visited. The topography of Western China and Central Asia, which had been sealed books since the days of Marco Polo, has been explored in many quarters. The elevations of the highest mountains of both hemispheres have been accurately determined, and themselves ascended to heights never before attained: and the upper regions of the air have been ballooned to the extreme limit beyond which the life-sustaining organs of the human frame can no longer perform their functions. In hydrography the depths of the great oceans have been sounded, their shores mapped, and their physical and natural history explored from the equator to beyond both polar circles. In the Arctic regions the highest hitherto attained latitudes have been reached; Greenland has been proved to be an island; and an archipelago has been discovered nearer to the Pole than any other land. In the Antarctic regions a new continent has been added to our maps, crowned with one of the loftiest known volcanoes, and the Antarctic ocean has been twice traversed to the 79th parallel. Nor have some of the negative results of modern exploration been less important, for the Mountains of the Moon and many lesser chains have been expunged from our maps, and there are no longer believers in the inland sea of Australia or in the open ocean of the Arctic pole. Of these and many others of the geographical discoveries of the last half century full accounts will be laid before you, prepared for this section by able geographers; of whom Mr. Markham will contribute Arctic discovery; Sir Richard Temple, Asiatic; Lieut.-Col. J. A. Grant and the Rev. Horace Waller, African; Mr. Trelawny Saunders, Western Palestine; the Hydrographer of the Admiralty will undertake the great oceans, and Mr. F. Galton will discuss the improvements effected in the instruments, appliances, and methods of investigation employed in geographical researches.

Of other branches of science which are auxiliary to scientific geography, the majority will be treated of in the sections of the Association to which they belong; but there are a few which I must not, in justice to the geographers who have so largely contributed to their advance, leave unnoticed.

Such is terrestrial magnetism,* which had as its first investigators two of our earliest voyagers, the ill-fated Hudson and Halley, who determined the magnetic dip in the North polar and tropical regions respectively. Theirs were the precursors of a long series of scientific expeditions, during which the dipping needle was carried almost from Pole to Pole, and which culminated in the establishment, mainly under the auspices of this Association, of the magnetic survey of Great Britain, of fixed magnetic observatories in all quarters of the globe, and of the Antarctic expedition of Sir James Ross, who, since the foundation of the Association, planted the dipping needle over the northern Magnetic Pole, and carried it within 200 miles of the southern one.

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* The subject of an able lecture 'On the Magnetism of the Earth,' delivered before the Royal Geographical Society by the Hydrographer of the Admiralty ('Proceedings,' vol. xxii. p. 188, 1878).

Nor is the geography of this half century less indebted to physicists, geologists, and naturalists. It is to a most learned traveller and naturalist, Von Baer, that the conception is due that the westward deflection of all the South Russian rivers is caused by the revolution of the globe on its axis.* It was a geologist, Ramsay, who explained the formation of so many lake beds in mountain regions by the gouging action of glaciers. It was a physicist and mountaineer, Tyndall, who discovered those properties of ice upon which the formation and movement of glaciers depend. The greatest of naturalist-voyagers, Darwin, within the same half century has produced the true theory of coral reefs and atolls, showed the relations between volcanic islands and the rising and sinking of the bottom of the ocean, and proved that along a coast-line of 2480 miles the southern part of the continent of South America has been gradually elevated from the sea-level to 600 feet above it. Within almost the same period Poulett Scrope and Lyell have revolutionised the theory of the formation of volcanic mountains, showing that these are not the long-taught upheavals of the crust of the earth, but are heaped up deposits from volcanic vents, and they have largely contributed to the abandonment of the venerable theory that mountain chains are sudden upthrusts. Within the same period, the theory of the great oceans having occupied their present positions on the globe from very early geological times was first propounded by Dana,† the companion of Wilkes in his expedition round the world, and is supported by Darwin and by Wallace.

In Meteorology the advance is no less attributable to the labours of voyagers and travellers. The establishment of the Meteorological Office is due to the energy and perseverance of a great navigator, the late Admiral FitzRoy.

Another domain of knowledge that claims the strongest sympathies of the geographer is Anthropology. It is only within the last quarter of a century that the study of man under his physical aspect has been recognised as a distinct branch of science, and represented by a flourishing society, and by annual international congresses.

I must not conclude this notice without a passing tribute to a department of Geography that has occupied the attention of too few of its cultivators. I mean that of literary research. Nevertheless, in this too the progress has been great; and I need only mention the publications of the Hakluyt Society, and two works of prodigious learning and the greatest value, 'The Book of Marco Polo, the Venetian,'‡ and 'A History of Ancient Geography,'§ to prove to you that one need not to travel to new lands to be a profound and sagacious geographer.

Geographical Distribution of Living Forms.—I have asked you to accept the geographical distribution of organic beings as the subject which I have chosen for this address. It is the branch with which I am most familiar; it illustrates extremely well the interdependence of those sciences which the geographer should study, and as I have before observed, its progress has been in the main due to the labours of voyagers and travellers.

In the science of distribution, Botany took the lead. Humboldt, in one of his essays,|| says that the germ of it is to be found in an idea of Tournefort, developed by

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* Von Baer, "Ueber ein allgemeines Gesetz in der Gestaltung der Flussbetten," 'St. Petersb. Bull. Sc.,' ii. (1860).

† Dana in 'American Journal of Science,' ser. 2, vol. iii. p. 352 (1847), and various later publications.

‡ By Colonel Henry Yule, c.b. (ed. 1, 1871; ed. 2, 1875).

§ By S. H. Bunbury (1879).

|| 'Sur les lois que l'on observe dans la distribution des formes végétales' (Mémoire lu à l'Institut de France, January 29, 1816).

Linnæus. Tournefort was a Frenchman of great learning, and, moreover, a great traveller. He was sent by the King of France in 1700 to explore the islands of Greece and mountains of Armenia, in the interests of the Jardin des Plantes, and his published narrative is full of valuable matter on the people, antiquities, and natural productions of the countries he visited. The idea attributed to him by Humboldt * is, that in ascending mountains we meet successively with vegetations that represent those of successively higher latitudes; upon which Humboldt observes: "Il ne fallut pas une grande sagacité pour observer que sur les pentes des hautes montagnes de l'Arménie, des végétaux des différentes latitudes se suivent comme les climats superposés l'un sur les autres;" but he goes on to remark, "cette idée de Tournefort developpée par Linné dans deux dissertations intéressantes (Stationes et Coloniæ Plantarum), renferment cependant le germe de la Géographie Botanique." Tournefort's idea was, however, an advanced one for the age he lived in, and should not be judged by the light of the knowledge of a succeeding century. He had no experience of other latitudes than the few intervening between Paris and the Levant. Humboldt himself did not suspect the whole bearing of the idea on the principles of geographical distribution, and that the parallelism between the floras of mountains and of latitudes was the result of community of descent of the plants composing the floras, nor that it was brought about by physical causes. The idea of the early part of the eighteenth century is, when rightly understood, found to be the forerunner of the matured knowledge of the middle of the nineteenth.

The labours of Linnæus, himself a traveller, and whose narratives give him high rank as such, paved the way to a correct study of botanical geography. Before his time little or no attention was paid to the topography of plants, and he was the first to distinguish, to lay down rules, and to supply models for these two important elements in their life-history—namely, their habitats or topographical localisation, and their stations, or the physical nature of their habitats. In his 'Stationes Plantarum,'† Linnæus defines with precision twenty-four stations characterised by soil, moisture, exposure, climate, &c., which, with comparatively slight modifications and improvements, have been adopted by all subsequent authorities. Nor, indeed, was any marked advance in this subject made, till geological observation and chemical analysis supplemented its shortcomings. In his essay 'De coloniis plantarum,' published fourteen years after the 'Stationes,'‡ he says, "Qui veram cunque et solidam plantarum scientiam aucupatur, patriam ipsarum ac sedem cujusque propriam haud sane ignorabit," and he proceeds to give an outline of the distribution of certain plants on the globe, according to climate, latitude, &c., and to indicate their means of transport by winds, birds, and other agencies. India (meaning the tropics of both worlds) he characterises as the region of palms; the temperate latitudes, of herbaceous plants; the northern, of mosses, algæ, and coniferæ; and America, of ferns;—thus preparing the way for the next great generaliser in the field.§

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* I have been unable to find any such idea expressed in Tournefort's works. Edward Forbes, however, also attributes the idea to Tournefort ('Memoirs of the Geological Survey,' vol. i. p. 351).

† 'Amœnitates Academicæ,' vol. iv. p. 64 (1754).

‡ Ibid., vol. viii. p. 1 (1768).

§ Between the dates of the writings of Linnæus and Humboldt, two notable works on geographical distribution appeared. One by Frid. Stromeyer ('Commentatio inauguralis sistens Historiæ Vegetabilium Geographicæ specimen,' Göttingen, 1800) is an excellent syllabus of the points to be attended to in the study of distribution, but without examples; the other is a too general work by Zimmermann, entitled, 'Specimen Zoologiæ Geographicæ, Quadrupedum Domicilia et Migrationes sistens,' Lugd. Bat. 1777, which he followed by 'Geographische Geschichte des Menschen und der

This was the most accomplished and prolific of modern travellers, Humboldt, who made Botany a chief pursuit during all his journeys, and who seems, indeed, to have been devoted to it from a very early age. His first work was a botanical one, the 'Flora Friburgensis,' and we have it on his own authority that three years before its publication, when he was only just of age (in 1790), he communicated to his friend, G. Förster, the companion of Cook in his second voyage, a sketch of a geography of plants. It was not, however, till his return from America that his first essay on Botanical Geography * appeared, which at once gave him a very high position as a philosophical naturalist. Up to the period of its appearance there had been nothing of the kind to compare with it for the wealth of facts, botanical, meteorological, and hypsometrical, derived from his own observations, from the works of travellers and naturalists, and from personal communication with his contemporaries, all correlated with consummate skill and discussed with that lucidity of exposition of which he was a master. The great feature of this essay is the exactness of the methods employed for estimating the conditions under which species, genera, and families are grouped geographically, and the precision with which they are expressed.

This was succeeded in 1815, and subsequently, by four other essays on the same subject. Of these the most valuable is the 'Prolegomena,' † in which he dwells at length on the value of numerical data, and explains his 'Arithmeticæ Botanices,' which consists in determining the proportion which the species of certain large families or groups of families bear to the whole number of species composing the floras in advancing from the Equator to the Poles, and in ascending mountains. Some kinds of plants, he says, increase in numbers relatively to others in proceeding from the Equator to the Poles, as ferns, grasses, amentiferous trees, &c.; others decrease, as Rubiaceæ, Malvaceæ, Compositæ, &c.; whilst others still, as Labiatæ, Cruciferæ, &c., find their maximum in temperate regions, and decrease in both directions. He adds that it is only by accurately measuring this decrease or increase that laws can be established, when it is found that these present constant relations to parallels of temperature.‡ Furthermore, he says that in many cases the whole number of plants contained in any given region of the globe may be approximately determined by ascertaining the number of species of such families.

The importance of this method of analysing the vegetation of a country in researches in geographical botany is obvious, for it affords the most instructive method of setting forth the relations that exist between a flora and its geographical position and climatal conditions.

Humboldt's labours on the laws of distribution were not limited to floras, they included man and the lower animals, cultivated and domesticated, as well as native;

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allgemein verbreiteten vierfüssigen Thiere, nebst einer hieher gehörigen Zoologischen Weltkarte,' Leipsic, 1778-1873.

* 'Essai sur la Géographie des Plantes, par A. de Humboldt et Aimé Bonpland; rédigée par A. de Humboldt, lu à la Classe des Sc. Phys. et Math. de l'Institut National,' 17 Nivôse de l'An 13, 1805.

† 'De Distributione Geographica plantarum secundum cœli temperiem et altitudinem Montium, Prolegomena.' This appeared in quarto in the first volume of the 'Nova Genera et Species Plantarum,' in 1815, and separately in an octavo form in 1817. Humboldt's other works on geographical distribution are 'Notationes ad Geographiam Plantarum spectantes,' 1815; 'Ansichten der Natur,' 1808, and ed. 2, 1827; 'Nouvelles Recherches sur les lois que l'on observe dans la distribution des formes végétales' (1816); and an article with a similar title in the 'Dictionnaire des Sciences Naturelles,' vol. xviii. p. 422 (1820).

‡ Humboldt's Isothermal lines and Laws of Geographical distribution are obviously the twin results of the same researches, one physical, the other biological.

they may not be works of the greatest originality, but they show remarkable powers of observation and reflection, astonishing industry, conscientious exactitude in the collection of data, and sagacity in the use of them: he is indisputably the founder of this department of geographical science.

No material advance was made towards improving the laws of geographical distribution* so long as it was believed that the continents and oceans had experienced no great changes of surface or of climate since the introduction of the existing assemblages of animals and plants. This belief in the comparative stability of the surface was first dispersed by Lyell, who showed that a fauna may be older than the land it inhabits. To this conclusion he was led by the study of the recent and later tertiary molluscs of Sicily, which he found had migrated into that land before its separation from the continent of Italy. Just, he adds, as the plants and animals of the Phlegræan fields had colonised Monte Nuovo since that mountain was thrown up in the sixteenth century; whence, he goes on to say, we are brought to admit the curious result that the fauna and flora of Val de Noto, and of some other mountain regions of Italy, are of higher antiquity than the country itself, having not only flourished before the lands were raised from the deep, but even before they were deposited beneath the waters.† The same idea occurred to Darwin who, alluding to the very few species of living quadrupeds which are altogether terrestrial in habit, that are common to Asia and America, and to these few being confined to the extreme frozen regions of the North, adds, "We may safely look at this quarter (Behring's Straits), as the line of communication (now interrupted by the steady progress of geological change), by which the elephant, the ox, and the horse entered America, and peopled its wide extent."‡

The belief in the stability of climatal conditions during the lifetime of the existing assemblages of animals and plants was also dispelled by the discovery throughout the northern temperate regions of the old and new worlds, of Arctic and boreal plants on all their mountains and of these fossilised on their low lands, and which discoveries led to the recognition of the glacial period and glacial ocean.

The first and boldest attempt to press the results of geological and climatal changes into the service of botanical and zoological geography, was that of the late Edward Forbes, a naturalist of genius, who, like Tournefort, chose the Levant as the field of his early labours. In the year 1846, Forbes communicated a paper to the Natural History section of this Association, on the distribution of endemic plants, especially those of the British Islands, considered with regard to geological changes.§ In this paper the British flora is considered to consist of assemblages of plants from five distinct sources, which, with the exception of one, immigrated during periods when the British Isles were united to the continent of Europe, and have remained more or less localised in England, in Scotland, or in Ireland. Of these he considered the Pyrenean assemblage, which is confined to the west of Ireland, to be the oldest, and to have immigrated after the eocene period, along a chain of now submerged mountains, that extended across the Atlantic from Spain to Ireland, and indeed formed the eastern boundary of an imaginary continent of miocene age, which extended to the Azores Islands, and beyond them. This, the "Atlantis" of speculative geologists, has long since been abandoned. The second assemblage is of plants characteristic of the south-west of France, which now prevail in Devon, Cornwall, and the Channel Islands; their immigration he assigns to a miocene date, probably corresponding to the red crag. The third assemblage is of plants of the north-east of France, which abound in the chalk districts of the south-eastern counties of England; their immigration is referred to the era of the mammaliferous crag. The fourth is of Alpine plants now found on the mountains of Scotland, Wales, and England; these were introduced mainly by floating ice from Scandinavia during the glacial period, when the greater part of the British Isles was submerged, its mountain tops forming part of a chain of islands in the glacial sea that extended to the coast of Norway; this was during the newer pliocene period. Lastly, the Germanic plants were introduced during the upheaval of the British Islands from the glacial ocean, and as the temperature was gradually increasing; these are spread over the whole islands, though more abundant on the eastern side. At the commencement of this immigration England was supposed to be continuous with the Germanic plains, from which it was subsequently severed by the formation of the English Channel. Also, at the commencement of this immigration Ireland was assumed to be continuous with England, to be early severed by the formation of the Irish Sea; which severance, by interrupting the migration of Germanic types, accounts for the absence of so many British animals in the sister island.

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* I do not hereby imply that no progress was made in the knowledge of the facts of distribution, for over and above many treatises on the distribution of the plants of local floras, there appeared in 1816, Schouw's 'Dissertatio de sedibus plantarum originariis'; which was followed in 1822 by his excellent 'Grundtrack til el almendelig Plante-Geographie,' of which the German edition is entitled, 'Grundzüge einer allgemeiner Pflanzengeographie.'

† 'Principles of Geology,' ed. 3, vol. iii. p. 376 (1834).

‡ 'Journal of Researches in Geology and Natural History, &c.,' p. 151 (1839).

§ 'British Association Reports,' 1845, pt. ii. p. 67, and 'Annals and Magazine of Natural History,' vol. xvi. p. 126. This the author followed by a much fuller exposition of the subject, which appeared in the 'Memoirs of the Geological Survey of the United Kingdom,' vol. i. p. 336 (1846), entitled, 'On the connection between the distribution of the existing flora and fauna of the British Isles, and the geological changes which have affected their area, especially during the epoch of the northern drift.' After many years interval I have re-read this Memoir with increased pleasure and profit. The stores of exact information which he collected concerning the plants, the animals, and the geology of Europe and North America, appear to me to be no less remarkable

I have thus briefly related Forbes' views, to show how profoundly he was impressed with the belief that geographical and climatal conditions were the all-powerful controllers of the migrations of animals and plants. Forbes was the reformer of the science of geographical distribution.*

Before the publication of the doctrine of the origin of species by variation and natural selection, all reasoning on their distribution was in subordination to the idea that these were permanent and special creations; just as, before it was shown that species were often older than the islands and mountains they inhabited, naturalists had to make their theories accord with the idea that all migration took place under existing conditions of land and sea. Hitherto the modes of dispersion of species, genera, and families had been traced; but the origin of representative species, genera, and families remained an enigma; † these could be explained only by the

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than the skill with which he correlated them and educed from the whole so many very original and in great part incontrovertible conclusions.

* I cannot dismiss the subject of the geography of the British flora without an allusion to the labours of Hewett Cottrell Watson, who, after a life devoted to the topography of British plants, was laid in the grave only a month ago. Watson was the first botanist who measured the altitudinal range of each species, and, by a rigidly statistical method traced their distribution in every county, and grouped them according to their continental affinities, as well as by the physical conditions of their habitats.

† The representation of species Forbes alludes to as "an accident . . . . which has hitherto not been accounted for." Mem. Geol. Survey, vol. i. p. 351.

supposition that the localities where they occurred presented conditions so similar that they favoured the creation of similar organisms, which failed to account for representation occurring in the far more numerous cases where there is no discoverable similarity of physical conditions, and of their not occurring in places where the conditions are similar. Now under the theory of modification of species after migration and isolation, their representation in distant localities is only a question of time and changed physical conditions. In fact, as Darwin well sums up, all [*] the leading facts of distribution are clearly explicable under this theory; such as the multiplication of new forms; the importance of barriers in forming and separating zoological and botanical provinces; the concentration of related species in the same area; the linking together under different latitudes of the inhabitants of the plains and mountains, of the forests, marshes, and deserts, and the linking of these with the extinct beings which formerly inhabited the same areas; and the fact of different forms of life occurring in areas having nearly the same physical conditions.

With the establishment of the doctrine of the orderly evolution of species under known laws, I close this list of those recognised principles of the science of geographical distribution, which must guide all who enter upon its pursuit. As Humboldt was its founder, and Forbes its reformer, so we must regard Darwin as its latest and greatest lawgiver. With their example and their conclusions to guide, advance becomes possible whenever discovery opens new paths, or study and reflection retraverse the old ones.

And it was not long before palæontology brought to the surface new data for the study of the present and past physical geography of the globe.

This was the discovery in Arctic latitudes of fossil plants whose existing representatives are to be found only in warm temperate ones. To Arctic travellers and voyagers this discovery is wholly due. Of these, I believe I am correct in saying that Sir John Richardson was the earliest, for he, in the year 1848, when descending the McKenzie river to the Polar Sea in search of the Franklin Expedition, found in lat. 65° N. beds of coal, besides shales full of leaves of forest trees belonging to such genera as the maple, poplar, taxodium, oak, &c. In the narrative of his journey,[†] Richardson mentions these fossils and figures some of them; and in a subsequent work [‡] he speaks of them as "leaves of deciduous trees belonging to genera which do not in the present day come so far north on the American continent by ten or twelve degrees of latitude." This discovery was followed in 1853 by the still more remarkable one by Captain M'Clure and Sir Alexander Armstrong (during another search for Sir John Franklin), of pine cones and acorns imbedded in the soil of Banksland, in lat. 75° N., at an elevation of 300 feet above the sea-level. And again in 1854, Dr. Lyall found extensive accumulations of similar fossils near Disco in Greenland (lat. 70° N.), during the return of Sir Edward Belcher's searching expedition. Nor are these fossils confined to America; they have been found in Spitzbergen, in Siberia, and in many other localities within the Polar area as well as south of it, proving that forests of deciduous trees, in all respects like those of the existing forests of the warm temperate regions, approached to within 10 degrees of the Pole. The first of these collections critically examined was Dr. Lyall's; it was communicated to Professor Heer of Zurich, the highest authority on the flora of the tertiary period, and described by him,* as were also subsequently all the other collections brought from the Arctic regions.†

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[*] Of the many pre-Darwinian writers on distribution who advocated the Lamarckian doctrine of evolution, I am not aware of any who suggested that it would explain the existence of representative species, or indeed any other of the phenomena of distribution. Von Baer, however, in the very year of the publication of the first edition of the 'Origin of Species,' expressed his conviction, chiefly grounded on the laws of geographical distribution, that forms now specifically distinct have descended from a single parent form. See 'Origin of Species,' ed. 5, Historical Sketch, p. 23.

[†] 'Boat Voyage through Rupert's Land and in the Arctic Sea,' vol. i. p. 186.

[‡] 'Polar Regions,' p. 289.

The examination of these fossil leaves revealed the wonderful fact that, not only did they belong to genera of trees common to the forests of all the three northern continents, such as planes, beeches, ashes, maples, &c., but that they also included what are now extremely rare, and even local genera, as sequoia, liquidamber, magnolia, tulip-trees, gingkos, &c., proving that the forests were of a more mixed character than any now existing. These results opened up a new channel for investigating the problem of distribution, and the first naturalist to enter it was a botanist, Dr. Asa Gray, who pursued it with brilliant results, embodied in a series of memoirs on the vegetation of the United States of America, and of which my notice must be most brief.

When studying the collections of Japanese plants brought by the officers of Wilkes' expedition, Dr. Gray found cumulative evidence of the strong affinity between the flora of Eastern Asia and Eastern North America, to the exclusion of the western half of that continent; and also that Europe and Western Asia did not share in this affinity. But what especially attracted his attention was, that this affinity did not depend only on a few identical or representative genera but upon many endemic genera of exceptional character, and often consisting of only two almost identical species. This led to a rigorous comparison of those plants with the fossils from the Arctic regions whose affinities had been determined by Heer, and with others which had been meanwhile accumulating in the United States, and had been described by Lesquereux; and the result was what I may call an abridged outline history of the flora of North America in its relations to the physical geography of that country, from the cretaceous to the present time.

The latest researches which have materially advanced our knowledge of the laws of distribution are those of Professor Blytt, of Christiania. His essay on 'The Immigration of the Norwegian Flora during alternately rainy and dry periods,' has for its object to define and localise the various assemblages of plants of which that flora is composed, and to ascertain their mother-country and the sequence of their introduction. The problem is that of Professor Forbes, which I have already described to you, only substituting Norway for the British Isles. Both these authors invoke the glacial period to account for the dispersion of Arctic plants, both deal with a rising land, both assume that immigration took place over land; but Professor Blytt finds another and most powerful controlling agent, in alternating periods of greater moisture and comparative drought, of which the Norwegian peat bogs afford ample proof. These bogs were formed during the rise of the land, as the cold of the glacial period declined. They are found at various heights above the sea in Norway; the most elevated of them are of course the oldest, and contain remains of the earliest immigrants. The lowest are the newest, and contain remains of the latest introduced plants only. The proofs of the alternating wet and dry seasons rest on the fact that the different layers of peat in each bog present widely different characters, contain the remains of different assemblages of plants, and these characters recur in the same order in all the bogs. First there is a layer of wet spongy peat, with the remains of bog-mosses and aquatic plants; this gradually passes upwards into a layer of dry soil containing the remains of many land plants, and prostrate trunks of trees, showing that the country was forested. To this succeeds wet spongy peat as before, to be again covered with dry peaty soil and tree trunks, &c., and so on. From an examination of the plant remains in these formations, Professor Blytt draws the following conclusions:—

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* "Ueber die von Dr. Lyall in Grönland entdeckten fossilen Pflanzen," 'Zurich. Vierteljahrsschrift,' vol. vii. p. 176 (1862).

† 'Flora fossilis Arctica.'

The Norwegian flora began with an immigration of Arctic plants during a dry period, evidence of which he finds in the presence of the remains of these beneath the lowest layer of peat. As the climate became warmer and the land rose, a rainy period set in, accompanied by an immigration of subarctic plants (juniper, mountain ash, aconites, &c.), which to a great extent replaced the Arctic flora, which is impatient of great wet. This was the period of the first peat-bog formation. It was followed by a dry period, during which the bogs gradually dried up; while with the increasing warmth deciduous trees and their accompanying herbaceous vegetation were introduced. The succeeding rainy season produced a second peat formation, killing and burying the deciduous trees, the increasing warmth at the same time bringing in the Atlantic flora, characterised by the holly, foxglove, and other plants now confined in Norway to the rainy Atlantic coast. To this succeeded a third period of drought, when the bogs dried up and pine forests with their accompanying plants immigrated into Norway, to be in like manner destroyed and buried by bog earth during the next following rainy period; and it was during these last alternations that the subboreal plants now affecting the lowest south-eastern districts of Norway were introduced; and the subatlantic plants, the most southern of all the types, which are confined to the extreme south of the country.

It would be premature to regard all Professor Blytt's recurrent periods as irrefragably established, or his correlations of these with the several floras as fully proved; but there is no doubt, I think, that he has brought forward a *vera causa* to account for the alternation of dry country with wet country plants in Norway, and one that must have both actively promoted the first introduction of these into that country as also influenced their subsequent localisation. It would strengthen Professor Blytt's conclusions very much if his alternating periods of rain and drought should be found to harmonise with Mr. Croll's recurrent astronomical periods, and with Mr. Geikie's fluctuations of temperature during the decline of the glacial epoch: so would also the finding in the bogs of Scotland a repetition of the conditions which obtain in those of Norway; and there are so very many points of resemblance in the physical geography and vegetation of these two countries that I do not doubt a comparison of their peat formations would yield most instructive results.

Thus far all the knowledge we have obtained of the agents controlling geographical distribution has been derived from observations and researches on northern animals and plants, recent and tertiary. Turning now to the southern hemisphere, the phenomena of distribution are much more difficult of explanation. Geographically speaking, there is no Antarctic flora except a few lichens and seaweeds. The plants called Antarctic,* from their analogy with the Arctic, are very few in number, and nowhere cross the 62° of south latitude. They are, in so far as they are endemic, confined to the southern islands of the great southern ocean, and the mountains of South Chili, Australia, Tasmania, and New Zealand; whilst the few non-endemic are species of the nearest continents, or are identical with temperate northern or with subarctic or even Arctic species. Like the Arctic flora, the Antarctic is a very uniform one round the globe, the same species, in many cases, especially the non-endemic, occurring on every island, though there are sometimes thousands of miles of ocean between the nearest of these. And, as many of the island plants reappear on the mountains above mentioned, far to the north of their island homes, it is inferred on these grounds, as well as on astronomical and geological, that there was a glacial period in the southern temperate zone as well as in the northern.

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* For accounts of the Antarctic flora, see the 'Botany' of the Antarctic Expedition of Sir James Ross, where the relations of the floras of the southern hemisphere with the Antarctic are discussed in introductory chapters.

The south temperate flora is a fourfold one. South America, South Africa, Australia, and New Zealand contain each an assemblage of plants differing more by far amongst themselves than do the floras of Europe, North Asia, and North America; they contain, in fact, few species in common, except the Antarctic ones that inhabit their mountains. These south temperate plants have their representative species and genera on the mountains of the tropics, each in their own meridian only, and there they meet immigrants from all latitudes of the northern hemisphere. Thus the plants of Fuegia extend northward along the Andes, ascending as they advance. Australian genera reappear on the lofty mountain of Kini-balu in Borneo; New Zealand ones on the mountains of New Caledonia; and the most interesting herbarium ever brought from Central Africa, that of Mr. Joseph Thomson, from the highlands of the lake districts, contains many of the endemic genera, and even species of the Cape of Good Hope. Nor does the northern representation of the south temperate flora cease within the tropics; it extends to the middle north temperate zone; Chilian genera reappearing in Mexico and California; South African in North Africa, in the Canary Islands, and even in Asia Minor;* and Australian in the Khasia Mountains of East Bengal, in East China and Japan.

So too there is a representation of genera in the southern temperate continents, feeble numerically compared to what the north presents, but strong in other respects. This is shown by the families of Proteaceæ, Cycadeæ and Restiaceæ, abounding in South Africa and Australia alone, though not a single species or even genus of these families is common to the two countries; by New Zealand, with a flora differing in almost every element from the Chilian, yet having a few species of both calceolaria and fuchsia, genera otherwise purely American; whilst as regards Australia and New Zealand, it is difficult to say which are the most puzzling, the contrasts or the similarities which their animal and vegetable productions present.

These features of the vegetation of the south temperate and Antarctic regions, though they simulate those of the north temperate and Arctic, may not originate from precisely similar causes. In the absence of such evidence as the fossil animals and plants of the North afford,† there is no proof that the Antarctic plants found on the south temperate Alps, or the south temperate plants found in the mountains of the tropics, originated in the south; though this appears probable from the absence in the south of so many of the leading families of plants and animals of the north, no less than from the number of endemic forms the south contains. These considerations have favoured the speculation of the former existence, during a warmer period than the present, of a centre of creation in the Southern Ocean, in the form of either a continent or of an archipelago, from which both the Antarctic and Southern endemic forms radiated. I have myself suggested continental or insular extension * as a means of aiding that wide dispersion of species over the Southern Ocean, which it is difficult to explain without such intervention; and the discovery of beds of fossil trunks of trees in Kerguelen's Island, testifies to that place having enjoyed a warmer climate than its present one.

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* *Pelargonium Endlicherianum* in the Taurus is a remarkable instance.

† The only fossil leaves hitherto found in higher southern latitudes are those of beeches, closely allied to existing southern species, brought by Darwin from Fuegia. In one locality alone beyond the forest region of the south have fossil plants been found; these were silicified trunks of trees in lava beds of Kerguelen's Island (discovered by myself forty years ago). It is deeply to be regretted that searches for shales containing fossils were not made either by the *Challenger* expedition or by the various "transit of Venus expeditions" that have recently visited this interesting island.

The rarity in the existing Archipelago (Kerguelen's Island, the Crozets, and Prince Edward's Island) of any of the endemic genera of the south temperate flora, or of representatives of them, is, however, an argument against such land, if it ever existed, having been the birthplace of that flora; and there are two reasons for adopting the opposite theory, that the southern flora came from the north temperate zone. Of these, one is the number of northern genera and species (which from their all inhabiting north-east Europe, I have denominated Scandinavian),† that are found in all Antarctic and south temperate regions, the majority of them in Fuegia, the flora of which country is, by means of the Andes, in the most direct communication with the northern one. The other is the fact I have stated above, that the several south temperate floras are more intimately related to those of the countries north of them than they are to one another.

And this brings me to the latest propounded theoretical application of the laws of geographical distribution. It is that recently advanced by Mr. Thiselton Dyer, in a lecture 'On Plant Distribution as a field of geographical research;'‡ wherein he argues that the floras of all the countries of the globe may be traced back at some time of their history to the northern hemisphere, and that they may be regarded in point of affinity and specialisation as the natural results of the conditions to which they must have been subjected during recent geological times, on continents and islands with the configuration of those of our globe. This hypothesis derives its principal support from the fact that many of the most peculiar endemic plants of the south have representatives in the north, some of them living and all of them in a fossil state, whilst the northern endemic forms have not hitherto been found fossil in the southern regions. So that, given time, evolution, continental continuity, changes of climate and elevations of the land, and all the southern types may be traced back to one region of the globe, and that one palæontology teaches us is the northern.

A very similar view has been held and published at the same time by Count Saporta,§ a most eminent palæontologist, in a suggestive essay entitled 'L'Ancienne Végétation Polaire.' Starting from Buffon's thesis, that the cooling of the globe having been a gradual process, and the Polar regions having cooled first, these must have first become fit for organic life, Count Saporta proceeds to assume that the termination of the azoic period coincided with a cooling of the waters to the point at which coagulation of albumen does not take place, when organic life appeared in the water itself. I have discussed Count Saporta's speculations elsewhere; || it is

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* 'Flora Antarctica,' pp. 230, 240. See also Moseley in Journ. Linn. Soc., Botany, vol. xv. p. 485, and 'Observations on the Botany of Kerguelen's Island,' by myself, in the 'Philosophical Transactions,' vol. 168, p. 15.

† See "Outlines of the Distribution of Arctic Plants," 'Transactions of the Linnean Society,' vol. xxiii. p. 257. Read June 1860.

‡ 'Proceedings of the Royal Geographical Society,' vol. xxii. p. 412 (1878).

§ 'Comptes Rendus' of the International Congress of Geographical Science, which met in Paris in 1875, but apparently not published till 1877.

|| Address of the President delivered at the anniversary meeting of the Royal Society of London, November 30, 1878.

sufficient here to indicate the more important ones as bearing upon distribution. These are that the Polar area was the centre of origination of all the successive phases of vegetation that have appeared on the globe, all being developed in the north; and that the development of flowering plants was enormously augmented by the introduction during the latter part of the secondary period of flower-feeding insects, which brought about cross-fertilisation.

It remains to allude briefly to the most important general works on distribution that have appeared since the foundation of this Association. Of these, the two which take the first rank are Professor Alphonse de Candolle's 'Géographie Botanique,' and Mr. Wallace's 'Geographical Distribution of Animals.' Professor de Candolle's work * appeared at a critical period, when the doctrine of evolution with natural selection had only just been announced, and before the great influence of geological and climatal changes on the dispersion of living species had been fully appreciated; nevertheless it is a great and truly philosophical work, replete with important facts, discussed with full knowledge, judgment, and scrupulous caution. Of its numerous valuable and novel features, two claim particular notice, namely, the chapters on the history of cultivated and introduced plants; and the further development of Humboldt's 'Arithmeticæ Botanices,' by taking into account the sums of temperatures as well as the maxima, minima, and means, in determining the amount of heat required to satisfy all the conditions of a plant's life, at the various periods of its existence, and especially the maturation of its seeds.

Of Mr. Wallace's great work 'The Geographical Distribution of Animals,' I cannot speak with sufficient knowledge of the subject, and can only appreciate and echo the high praises accorded to it by zoologists, for its scientific treatment of a vast subject.

The 'Géographie Botanique' was followed by the late Dr. Grisebach's 'Die Vegetation der Erde,'† which contains an admirable summary of the vegetation of the different regions of the globe as limited by their physical features, divested of all theoretical considerations.

For the largest treatment in outline of the whole subject of distribution, I must refer to the chapters of Darwin's 'Origin of Species' which are devoted to it.

In reference to these and other works, very able and instructive discussions of the principles of geographical distribution are to be found in the presidential addresses delivered before the Linnean Society, in 1869, 1870, and 1872, by the veteran botanist, G. Bentham.

With Mr. Wallace's 'Island Life,' I must conclude this notice, and very fittingly, for besides presenting an admirable account of the origin and migrations of animals and vegetables in oceanic and continental islands, it contains a complete and comprehensive analysis of those past and present conditions of the globe, astronomical, geological, geographical, and biological, which have been the earlier and later directors and controllers of the ever-warring forces of organic nature. In this work Mr. Wallace independently advocates the view of the northern origin of both the faunas and floras of the world.

I conclude with the hope that I have made the subject of the distribution of organic life on the globe interesting to you as geographers, by showing on the one

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* Professor Alph. de Candolle divides his subject into botanical geography and geographical botany; the distinction is obvious and sound, but the two expressions have been so long used and regarded as synonymous, and as embracing both branches, that they cannot now be limited each to one. Perhaps the terms topographical botany and geographical botany would prove more acceptable designations.

† Published in 1872. Translated into French under the title of 'La Végétation du Globe,' by P. de Tchihachef, Paris, 1875.

hand how much it owes its advance to the observations made and materials collected by geographical explorers, and on the other how greatly the student of distribution has, by the use he has made of these observations and materials, advanced the science of physical geography.

The following papers were also read on Thursday:—

The Equipment of Exploring Expeditions Now and Fifty Years Ago. By Francis Galton, F.R.S.—The equipment of a modern exploring expedition differs in many respects now from what it was in or about the year 1830, with the general result of increased efficiency and rapidity of execution. The standard instruments—namely, the theodolite, the sextant, the chronometer, and the azimuth compass—have not received any great improvements in the interval, and the best of those made in 1830 would be valued now. But they are made more handy and portable than they were, and at much lower cost for equal degrees of excellence. The modern water-tight cover, with the keyless winding arrangement of travellers' watches, is a great boon to them. The mercurial horizon, without which the sextant on land is almost useless for astronomical purposes, has been transformed from a lumbering trough shielded from the wind by a heavy glazed screen, which was difficult to fill and did not admit of the observation of low angles, into a very compact contrivance by Captain George, which is filled by tilting, and is sheltered from the wind by a piece of glass floating on the mercury. The liability to errors introduced by this arrangement is much smaller than might have been expected, and travellers speak highly of its merits. The appliances for measuring elevation above the sea-level have been greatly improved. The old method was to carry a mountain barometer, which, from the weight of the mercury and the fragility of the glass that contained it, was rarely carried far without breakage. Since then the aneroid has been invented, and the appliances connected with the boiling-point thermometer have been greatly improved. A traveller provided with these very portable instruments can use the aneroid for everyday purposes, checking its change of index error from time to time by boiling-point observations. Even the mercurial barometer has been rendered a comparatively portable instrument. The tubes are packed empty, and they are filled when required by Captain George's method, which in moderately careful hands is found to give good results. The enclosed thermometer for deep-sea observations is a recently invented instrument absolutely essential to accuracy.

The art of exploring ocean depths and performing what has been called Thalassography, has been immensely improved, owing to the requirements of submarine telegraphy and of such scientific expeditions as that of the *Challenger.* Sir W. Thomson's method of sounding at the depth of many fathoms without checking the ship's course is in full use, but Dr. Siemens' bathometer has not yet been made practically serviceable.

The accuracy of thermometric graduation has been greatly increased by the verifications afforded by the Kew Observatory, which is the child of the British Association, established, and for a long time maintained, by a yearly grant from its funds, but now supported by the endowment of Mr. Gassiot. The errors in thermometers occasionally furnished even by the best makers in 1830, were such as would not be tolerated now. The verifications of Kew are extended to other instruments, and the influence of the observatory for good is firmly established and appears to be yearly increasing. Of the other appliances for geographical travellers—such as scales for plotting, metal pens which were invented since 1830, and that admirable recent contrivance the stylographic pen—it is unnecessary to speak in detail. The binocular opera-glass is, practically speaking, a new instrument, and its merits as a night-glass were first found out long after 1830. The lunar tables of the 'Nautical Almanack' have been greatly improved of late years, for in 1830 their predictions of the place of the moon could not have been trusted as they now are for delicate determinations of longitude. Lastly, the means of instruction in the use of geographical instruments is at length afforded by the Geographical Society, who have erected a small observatory on the roof of their premises, where instruction is given on moderate terms to intending travellers.

The modern equipment of travellers as regards dress has been greatly improved by the general use of flannel, which is a most important preservative of health, but was neglected half a century ago. Thus, at much more recent times than 1830, the hardy Swiss guides had a horror of what they called a *coup d'air*, or a chill on the mountain top, when they were hot and perspiring; and no wonder, as they then all wore linen shirts next the skin. The modern loose form of dress, the shooting boots and easy overcoat, are a vast improvement on the pinched costumes of 1830. The derivation of the word paletôt conveys a history. The first warm and convenient coats used in England were reproductions long subsequent to 1830 of those used by sailors in rough weather under the name of "pilot coats" (and were sometimes, for the sake of shortness, called "p. coats" or "pea-coats"). They quickly became the fashion, were copied and made more elegantly by the French, who adapted our name of "pilot coat" to their own pronunciation of paletôt, and so we received it back from them. Indiarubber and guttapercha adaptations to articles of dress and manufactures generally date from a little subsequent to 1830; they are invaluable for many purposes to exploring expeditions. The form of tent has been greatly improved. Portable mackintosh and other boats are comparatively recent contrivances, and have done good service. Lucifer-matches had been invented, but only very recently, in 1830.

The equipment of a travelling party as regards packsaddles has been improved, chiefly through Australian experiences, where, moreover, the camel has been introduced as a beast of burden, with more success than the tamed elephant in Africa. The art of sledge travelling has been vastly improved by the skilful cutting down of all superfluous weight, enabling travellers to drag more food, and so to journey a larger number of days from their depôts.

As regards food, the tinned meats, compressed vegetables, and condensed milk, which are invaluable during the first days of travel before the expedition has settled into regular ways, are all late inventions, and the merits of lime-juice are now far better understood than they were fifty years ago.

The *personnel* of a travelling party is decidedly improved. Whatever may be the state of the physique of the lower orders of the population, there can be no doubt that the upper orders are physically better developed than they were. They are, as I have good reason to believe, in the absence of direct measurements, taller; they achieve greater feats in running, leaping, walking, and other athletic performances than their grandfathers did. They lead healthier lives, from the discontinuance of the heavy eating and hard drinking of old days, from the better aired sleeping rooms, the existence of proper means of washing, and the seaside or Continental summer vacation.

The greatest benefit of all to travellers is the modern rapidity and ease with which distant parts of the world are now reached. In 1830 it required 70 days' sailing from England to reach the Cape of Good Hope, 120 days (in the S.W. monsoon) to reach Bombay, and 130 days to Sydney. It was 40 days' sail to New York, 42 to Jamaica, 56 to Rio, and 110 to Valparaiso. The length of time that the post now takes from London to these places is as follows: Cape Town 21 days, Bombay 18 days, Sydney 43 days, New York 10 days, Jamaica 18 days, Rio

21 days, Valparaiso 39 days; the average increase of speed being more than threefold. There is scarcely any important part of the world that cannot now be reached in two months from London; even the Antipodes are only 6 weeks' journey. This facility of communication is accompanied by a corresponding spread of commerce, and travellers can now easily refit themselves at distant points. It has recently occurred to the Geographical Society to have had to meet bills drawn upon her Majesty's consul at Zanzibar by a traveller in their employ, for which he had been furnished with goods by Arab traders at Nyangwé on the Upper Congo, and at other places in Central Africa which had never before been visited by a white man.

Isochronic Postal Charts. By Francis Galton, F.R.S. (will be printed in the November number of the 'Proceedings').

On the Survey of Western Palestine by the Palestine Exploration Fund. By Trelawny Saunders.

Friday, September 2nd.

On the Progress of our Geographical Knowledge of Asia during the last Fifty Years.—By Sir Richard Temple, G.C.S.I., C.I.E., D.C.L.

The area of Asia contains seventeen millions of English square miles. Out of this, about two-thirds consist of mountains and table-lands, whereof a large part is desert; and one-third of lowlands, wherein a small part is desert; the rest of the lowlands being arable, of which again a considerable portion is cultivated. Thus out of the whole area not more than one-sixth is under cultivation; among the populated tracts, however, some are the most densely peopled in the world. As regards climate, Japan and a part of China proper can be called temperate. The southern peninsulas of Asia have great heat, with but little relief from cold. The main Asiatic continent has extreme cold of varying duration in the year, followed by equally severe heat. Although some nomad tribes show kindness and hospitality to Europeans, and even to European ladies, still for travellers the fierceness of Man is but too often added to the wildness of Nature. The geographers in Asia therefore need not only intellectual ability and persistent diligence, but also the sternest moral qualities and the stiffest physical strength. In recounting their deeds we may adopt the Virgilian words "Arma virumque cano;" that is, we celebrate the work and the men who did it. And we remember the maxim "Nil mortalibus arduum," which for us means that nothing is too hard for geographers to attempt.

On the large map exhibited,* illustrating the physical geography of Asia, you will see clearly marked in the midst of the continent a great Central Plateau, more than two millions of English square miles in area, rising to great altitudes, which dominates the river systems and the drainage of the greater part of Asia, and which is bounded by the Himalayas towards the Indian Ocean, by the Yun-ling and the Inshan mountains towards the Pacific Ocean, by the Altai and Yablonoi ranges towards the Arctic Ocean, and by the Pamir mountains towards the inland seas, the Aral and the Caspian. The Pamir mountains constitute a group, connecting the great ranges of Himalaya and Altai.

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* Sir R. Temple's address was illustrated by two large wall-maps of Asia, drawn on the same scale—one prepared under the supervision of Mr. Trelawny Saunders, Geographer to the India Office, showing the principal features of the physical geography—the orography, and the hydrography; the other, furnished by the Royal Geographical Society, coloured red in different shades, to show the relative extent of our geographical knowledge of the various countries.

Branching off from this Central Plateau is another extensive Plateau with an average altitude of 5000 feet above the sea, which includes Afghanistan, Beluchistan, Persia, Armenia, and Asia Minor, and from a small part of which the drainage is towards the Atlantic Ocean, through the Black Sea and the Mediterranean. It is through Asia Minor and the Caucasus that the Asiatic mountains are connected with the ranges of southern Europe.

It is remarkable that from within this Central Plateau, walled round as it is by mountain ranges, there rise most of the greatest Asiatic rivers, which burst through the mountains in order to make a passage towards the sea. Such, for instance, are the Indus with its affluent the Satlej, the Brahmaputra, the Ganges, the Irawady, the Salwen, the Cambodia or Mekong, flowing into the Indian Ocean; the Yang-tsze Kiang, the Hoang-Ho, the Amur, flowing into the Pacific Ocean; the Lena, the Yenisei, and the Ob flowing into the Arctic Ocean; the Jaxartes and the Oxus flowing into the inland sea of Aral. Many other rivers, which though lesser are still very great, take their sources from the outer slopes of the mountains which surround the Central Plateau.

Next after the oceanic drainage, the inland Asiatic drainage, which finds no vent towards the ocean, may claim attention as being the largest in the world, and as occupying nearly four millions of English square miles, or nearly one-fourth of the Asiatic continent. This extraordinary drainage area may be divided into the following categories:—1st, the Caspian; 2nd, the Aral; 3rd, the Balkash (Siberian); 4th, Lake Lob (Yarkand); 5th, Koko-Nor; 6th, the lesser lakes of Tibet; 7th, the lesser lakes of Altai; 8th, the Helmand draining nearly all Afghanistan into the Seistan swamps; 9th, the Kavir or saline deserts in Eastern Persia; 10th, the lake of Urumiya in North-western Persia; 11th, Lake Van in Kurdistan; 12th, the Dead Sea.

The Central Plateau is made up of several plateaux having different altitudes. The highest is that of Tibet, on the average 15,000 feet above the sea, the loftiest in the world; next, that of Pamir, 13,000 feet; then that of Koko-Nor, 10,000 feet. Next we see a sudden dip or depression, namely, that of Yarkand or Western Gobi, only 3000 feet above the sea; then there follow two steps upwards, namely, that of Eastern Gobi, 4000 feet; and lastly that of Altai, 5000 feet.

The Central Plateau has been the home of most of the nomad and pastoral tribes which have successfully overrun the rest of Asia. It now belongs (with the exception of one tract) to the Chinese empire.

I next invite your attention to the other large diagram of Asia, with its political divisions indicated as they are now recognised to exist, namely:—I. India and Ceylon; II. Afghanistan and Beluchistan; III. Siam and Cochin China; IV. The Chinese Empire; V. Japan; VI. Asiatic Russia; VII. Persia; VIII. Asiatic Turkey and Arabia.

Upon this diagram are coloured in deep pink those portions which have been professionally and scientifically surveyed; in lighter pink those portions which have been surveyed non-professionally or roughly; in lightest pink those portions which have been explored only, without surveys; while the remaining portions, being unexplored, are left white.

For the southern coast of Asia, 15,000 miles in length, the geography is based on professional surveys. For the shores of the Red Sea, Southern Arabia, the Persian Gulf, Beluchistan, British India, Ceylon, and Siam, there are the scientifically framed charts of the British Admiralty or the Indian Marine. For the shores of Cambodia and Cochin China, there are the French surveys; for the Chinese coast the British surveys with a few intervals only; for the shores of Japan several surveys; and for the East Siberian coast up to Behring Strait, the Russian surveys at a few points only. The Arctic shore of Siberia, though explored, and at some few points partly surveyed, is for the most part unsurveyed.

I shall now advert very briefly to the work accomplished in each country during the time under review, that is since 1830.

I. INDIA AND CEYLON.—As this area, having a million of square miles, and a population the largest in the world next after that of China, forms part of the British Empire, we may expect to find that here the progress of geography has been during the last fifty years, or since 1830, far greater than in any other country of Asia. Seven great operations have been carried on, namely, the Great Trigonometrical Survey, the Topographical Survey, the land Revenue Survey, the Field or Cadastral Survey, the special surveys for railways, canals, and roads, the Marine Survey of the coast, and the Geological Survey. From the base of the Himalayan range down to the southernmost cape near Ceylon the British territories are delineated and depicted, not only mountain by mountain and river by river, but also village by village, even field by field, and are as minutely known as the most highly civilised districts on the globe, or the best managed estates in Europe. The classic streams of the Indus, the Ganges, the Jamna, and the Brahmaputra, immediately on issuing from their rock-bound beds in the main Asiatic range, so aptly termed in all ages "the Abode of Snow," are brought within the grasp of the geographer along their whole course, their banks being described, their velocity and fall per mile calculated, the volume of their waters measured. Similar processes have been adopted with the densely peopled basins of the rivers which rise in the purely Indian ranges. The altitude has been precisely determined of many of the loftiest peaks yet discovered on the earth, and of every range that is pierced by a railway or crossed by a road. The country has been covered by a network of triangles, a large arc of the meridian has been measured, the curvature, contour, and configuration of the land have been ascertained by geodetic work. Every spur, ravine, and torrent bed has been examined in the hills which are studded with tea or coffee plantations, or gold mines, or coal beds. In the Field-maps of the cultivated plains and valleys, every landmark in the fields, even every cottage or tenement is noted down. In two provinces only, Bengal and Behar, is the field survey wanting.

The Himalayan ranges are indeed under British domination, but have not been fully surveyed. Herbert was the pioneer; afterwards Brian Hodgson followed with excellent geographical analysis. The central portion of this region belongs to the Nepal State which has for the most part successfully resisted the advance of exploration within its limits. In the eastern portion, Sikkim was mapped by Dr. (now Sir Joseph) Hooker, and some knowledge was gained of Bhotan through the mission of Pemberton and Griffith, and later through the mission of Eden and the subsequent war. In the western portion, Kashmir has been topographically surveyed by Montgomerie; Ladakh has been explored by Shaw, Gilghit by Biddulph, the Pangong basin and the Mustagh by Godwin-Austen; Dr. Thomas Thomson was the first to reach the Karakoram pass; much original work has been performed in various directions by native Indian surveyors of high qualifications; something has been ascertained regarding Kafiristan by Tanner; Basevi and Stolicska fell victims to their scientific labours near the Yarkand border; surveyors have carried their instruments to altitudes of 21,500 feet above the sea; and year by year fresh passes are crossed by individual travellers.

Among the chiefs of the geographical department in India the names of Everest, Waugh, Walker, and Thuillier are conspicuous. Markham's memoir on the Indian Surveys furnishes a condensed history of the labours of those distinguished surveyors; and the catalogue of maps preserved at the India Office in London shows the results of their work.

The surveys of Ceylon are also in a nearly complete state, and the excellent map by Fraser, the Surveyor-General, and his successors supplies full information.

II. Afghanistan and Beluchistan.—Although these countries have been for more than one generation connected with the British Government, their geography is utterly incomplete. The territory indeed offers the utmost difficulty to surveying, being for the most part mountainous, with extreme cold in many quarters, the remainder being desert. It is not this difficulty, however, which prevents surveying. The real obstacle is the fierce and intractable character of the inhabitants, who would treat any attempt at surveying as a *casus belli*. The Government, then, has always to consider the alternative of fighting; because geographical efforts, unless backed by armed force, would end only in failure and bloodshed.

Some general account of the region was obtained by Mountstuart Elphinstone's embassy to Caubul in 1808, together with a map by Macartney. Many details have been subsequently supplied under circumstances of a stirring and adventurous character, by men whose memory will not be forgotten so long as the record of British zeal, constancy, and resolution shall endure. Alexander Burnes, Arthur Conolly, Eldred Pottinger, Henry Rawlinson, James Abbott, John Wood, have obtained particulars of Afghanistan and its dependencies from the sultry marshes of Seistan to the sources of the Oxus. These being officers of the Indian Government, had before their eyes the goal of a career in the public service. Others, however, travelled in a private capacity, holding their lives in their hands at all hours of the day and the night during weary months, and often subject to insult from cruel and barbarous people. Such were Moorcroft, Trebeck, Masson, Vigne, and the Frenchman Ferrier.

Little of surveying was effected during the first occupation of Afghanistan by the British from 1838 to 1841. The mission of Harry Lumsden to Candahar in 1857, the arbitration regarding the Seistan boundary in 1872, added something to our topographical knowledge. Much of recent information respecting the southern and western districts was embodied in the work by Dr. Bellew in 1874.

During the recent Afghan war from 1878 to 1880, a professional surveying staff was attached to the military establishments, and thus routes were surveyed and altitudes taken, on the lines for the march of troops. The results of this work have been embodied in the reports by Captain Holdich. On the whole, considerable data exist for the maps which have been issued by Thuillier and Walker in India and by Wilson in England. Still it is to be remembered that no comprehensive surveys have been possible, that in a few parts only of the country has the work been completely scientific, and that many parts (especially the Hazâra country and the Zhob valley) remain unexplored.

The geography of Beluchistan is even less advanced; of the north-eastern portion some knowledge has been obtained from the political and diplomatic proceedings of the last few years, and by the surveys for the railway from the Indus towards Candahar. The interior of this vast area is known only from the daring journey of Henry Pottinger, the travels of Masson, and the explorations connected with the Seistan mission.

III. Siam and Cochin China.—The country of Siam is known to English readers chiefly through the descriptive works published by Crawfurd of his mission in 1821, and by Bowring of his mission in 1855; these descriptions were not, however, derived from personal explorations in the interior. In 1854 the French Bishop Pallegoix published a map of his journeyings. Again, in 1864 another Frenchman, Mouhot, undertook under English auspices a scientific expedition up the course of the Meinam, the principal river of Siam, to near its source, and died from his fatigues.

In the deltaic region of Cambodia the French authorities are duly surveying their settlements around Saigon; and a French geographical literature for this district and the adjacent territories is fast accumulating. In 1866 a geographical and scientific expedition was undertaken by the French Government along the Mekong, the great river of Cambodia, right up to the regions near its source within the Chinese border. Of this important exploration some account was given by Carné in 1872, and a great report was published in 1873 by Garnier, splendidly executed and embellished with an album of pictorial illustrations. Garnier was, while still comparatively young, murdered by Chinese rebels. Further, these operations were connected with the Chinese coast by the explorations of Harmand in 1877.

For the rest of Cochin China, now called by its local name Anam, French authors have published several descriptive works. Here also explorations have been made by the French along the course of the Red River of Tonkin on the north near the frontier of China proper.

IV. THE CHINESE EMPIRE.—In this area, which has four millions of square miles, and by far the largest population of any country in the world, are included four main divisions, namely, 1st, China proper; 2nd, Manchuria; 3rd, Mongolia, Kulja, and Yarkand; 4th, Tibet. The Chinese have bestowed upon topography that marvellous aptitude for details which they evince in other subjects. For their enormous territories they have, through centuries of research, compiled monster gazetteers comprising several hundreds of maps and of volumes. But the examination was not conducted with anything like a scientific survey, the maps were not precise, nor was the general geography exactly determined. In the seventeenth century, however, one Chinese emperor employed the Jesuit missionaries to make the best surveys possible with the then existing appliances; and the results were collated by D'Anville in his famous 'Atlas de la Chine,' published at the Hague in 1737. In the eighteenth century another emperor caused further surveys to be made by the Roman missionaries, who fixed many points by astronomical observations about the year 1755; and these points were a century later presented to the English public by the appendix to Michell's book upon the Russians in Central Asia. The Jesuit surveys were also published in Europe by Du Halde. Those who know the persevering zeal of the Roman Catholic priests in Asia, will readily imagine how steadily these missionaries must have prosecuted their surveying operations. After them there was a lull in the advance of Chinese geography for three generations. Within the last generation, however, the Chinese empire has been the scene of many wonderful explorations. Again Roman Catholic missionaries, two Frenchmen, Gabet and Huc, led the way by toilsome marches of more than 7000 miles right through China proper and Mongolia, between the years 1845 and 1850. Gabet died from infirmities caused by his sufferings during this journey, but Huc survived to relate their proceedings in one of the most entertaining books of travel ever written. But in gauging the value of his information it must be remembered that he was not a surveyor nor a trained geographer. The Russian military officer Prejevalsky, the most scientifically trained, persevering, and capable traveller that has yet entered Mongolia, went over a part of the same ground in 1870, in the course of his successive explorations. He finds fault with some of Huc's observations and descriptions; but Colonel Henry Yule, one of the best of living English authorities on such subjects, has stated that Huc's word-pictures, brightened perhaps by a lively fancy, appear to have been drawn from nature, though errors had crept into them from imperfect recollection. Still, such books as that by Huc, however interesting, are not to be compared in solid merit with the exact and well-weighed work of Prejevalsky. In Mongolia also the journey of Ney Elias in 1872 proved to be very important; and the routes taken by the Russians, Potanin and Rafailoff, have been recently published by Petermann. The work has been carried on by the visit of Delmar Morgan to Kulja.

Further, the topography of Yarkand and Kashgar was elucidated by the mission of Sir Douglas Forsyth in 1873. Of this a full report has been written by Trotter, whose explorations were remarkable and extended to the Pamir lake. Yarkand was visited by Shaw twice, and once by Hayward, who lost his life. Further, Johnson penetrated to Khoten.

In the elevated plateau of Tibet no explorations had been made since the political missions of Bogle and Turner in the eighteenth century, which were despatched by Warren Hastings, the Governor-General of India, and the journey of Manning to Lhassa. Recently, however, in 1870, the French missionary Desgodins published the result of his Tibetan journeys extending over several thousands of miles. Here again the native Indian surveyors, trained by Montgomerie, have taken accurately many altitudes, determined the lacustrine characters of the plateau, and followed the course of the San-po, till it disappears amidst the Himalayas.

For China proper, another French missionary, David, in 1874 gave to the public the results of his ten years of travel extending over some 6000 miles. The Chinese nowadays offer the most liberal facilities to Christian missions for evangelistic tours, and many missionaries, English and French, are availing themselves of these opportunities. The best example of travel in China is the work of the German Richthofen, who, after covering the country with a network, as it were, of his journeyings, published in 1877 the most scientific, systematic, and elaborate of the books yet written on that country. In this work, among other things, much geological information is embodied. As might be expected, the English have made use of the advantages they possess in China for geographical exploration. A generation has passed since Fortune paid to the tea-districts those visits which have proved so fruitful in economic results. Blakiston has minutely determined the course of the lower Yang-tsze Kiang. Within the last few years, Cooper, Margary, Ney Elias, Gill, and Baber have courageously and laboriously passed from China across perilous regions straight through to India or to Burma. Of these, Cooper was killed by a half demented native soldier of his own escort, at Bhamo in Upper Burma. Margary was foully murdered with the collusion of the officials on the Chinese frontier. But Ney Elias, Gill, and Baber are still in the van of geographers, and may render future services to science.

Adjoining China, there is the comparatively small peninsula of the Corea, of which little is known except from the explorations of Dallet, the French missionary. The Corea is about to be visited by a surveying vessel, on board of which is our accomplished young Associate, Lieutenant Pirie, R.N.

V. JAPAN.—We next glance at the chain or group of picturesque, fertile, and populous islands—sometimes divided one from the other by narrow streaks of water—which constitute the dominion of Japan. Under their ancient and, as it would be called by some, their uncivilised system, the Japanese collected a mass of topographical information. All that was most valuable in this was collated by Siebold, a distinguished officer who was despatched by the Dutch Government of Java in 1823 on a commercial mission to Japan, where he resided till 1830. During his eight years of residence or travel in this country, he supplemented the Japanese geography by observations of his own, many of which bore a scientific character, and embodied the results in a large work of several quarto volumes. This work was completed in 1832, and is beautifully illustrated with pictorial representations which bring before the reader's eye a scenery which remains ever the same in its beauty, and national costumes or characteristics which are fast passing away under a new civilisation. From these data was the map prepared by Commodore Perry, of the United States Navy, for his work describing the commercial mission on which he proceeded twenty years later, in 1852. He again added much information, on scientific authority, for the extensive coasts of this island dominion. In 1863 Sir Rutherford Alcock, after an official residence of several years, published his work entitled 'The Capital of the Tycoon,' which embodied, among other things, the geographical results of inland travel and the ascent of lofty mountains. Subsequently the world has been astonished by the wave of quasi-European civilisation which is sweeping over many of the old institutions in this country. Among the consequences of this is the introduction of projects for postal roads, electric telegraph lines, railways, and other purposes of an administration framed after European models. For the railway lines, surveys have been or are being made. A line across the principal island has been determined by trigonometry. Some geological surveys have also been carried out. From these, combined with the former data, a map was made by Mr. Brunton, in the Japanese service, and more recently a still better map has been prepared by Knipping, a German, also in the Japanese service, and engraved by Stanford of London. A handbook has been prepared by Mr. Satow, on the staff of the British embassy, and by Lieutenant Hawes of the Royal Marines. Lastly, an English lady, Miss Bird, having traversed important tracts in solitude and hardship, with amazing constancy and endurance, has set forth her observations in a graphic and life-like narrative.

VI. Asiatic Russia.—In this area, which contains six millions of square miles, are included, first, Siberia and Russian Manchuria; secondly, Caucasia, including the Caucasus mountains, together with the region lying between them and Armenia; thirdly, Western Turkistan, now extending to the northern boundary of Persia.

For Siberia, the meritorious travels of Pallas at the end of the eighteenth century, of Wrangel, of Middendorff, of Erman, of Alexander Humboldt during the first half of the present century, are still of value. But systematic modern exploration, combining geology and zoology with geography, began in 1854 with the operations of Schwarz, Schmidt, and others in the upper basins of the Lena and Amur rivers. This work was followed up by the expedition under Prince Kropotkin (a good geologist) to the same region in 1873, and by Poyarkow's explorations of the Amur. A further examination was made of the river Lena by Lopatkin, of the Amur by Maack the naturalist, and by Schrenck (whose work has fine zoological illustrations), and of the Lower Amur by Bolshev in 1874. The basin of the river Ob was visited by Polyakoff, and of the Yenisei by Krivoshapkin. The mountain region of the Altai and the north of Siberia have been described by the works of Radde (rich in pictorial illustration), and by the book of travels undertaken by the German Finsch in connection with the North Polar Expedition of Germany; also by the works of many other travellers. In short, the Russians have within the last thirty years accumulated quite a geographical literature and published a series of excellent maps regarding Siberia and Kamchatka, the particulars of which would exceed the space at our disposal. Thereby the principal points have been scientifically fixed, the altitudes of many of the mountains have been ascertained, and the basins of the principal rivers have been examined. But it is hardly to be expected that regular surveying can as yet have been extended throughout a region so vast, inclement, and inhospitable. The survey of the country must be regarded as still unfinished, and the information as approximate only for many places. Still the geographical results already obtained are honourable to the Russian Government, and prove the skill and resolution of the explorers.

The voyage of the distinguished Swede Nordenskiöld along the northern coast of Siberia resulting in the discovery of the North-east passage, and the rectification of the coast-line by his colleague Palander, are fresh in the memory of all; but it ought not to be forgotten that here the way was led by Wiggins of Sunderland.

The borders of Western Siberia have been trigonometrically and geologically surveyed, and with those operations the great name of Sir Roderick Murchison is honourably associated.

For English readers, several parts of Siberia have been recently described by the Rev. Henry Lansdell, after a journey of 8000 miles from the Urals to the Pacific. The Altai mountains, even within Mongolian limits, and the Siberian plains, also have been graphically illustrated by Atkinson, a portion of whose toils was shared by his courageous wife, and whose life was prematurely ended by the hardships he endured during his travels. Among the precursors of travelling on the Amur was Collins the American. Then Kennan published the story of his tent life in Siberia, and Bush an account of reindeer dogs and snowshoes; both these travellers were American. The Englishman, Seebohm, descended the Yenisei to the Arctic circle, in the prosecution of ornithological studies.

Next, for Caucasia, trigonometrical surveys have been made by the Russian Government between the years 1830 and 1860, and a large map has been prepared by the topographical staff. Here we meet again with pictorial illustrations by Radde, adorning his geographical work on this region. The Caucasus itself has been visited by English travellers, Moore, Grove, and especially by Freshfield, who ascended apparently for the first time the summit of Elbruz, and has presented to English readers a charming narrative of his proceedings.

Lastly, for Western Turkistan, the Russian Government has caused some important surveys to be made and several scientific expeditions to be undertaken within the last fifteen years. This geographical literature has become so varied and extensive that the names of the distinguished Russian officers connected with it are too numerous to be mentioned in our limited space. One of these Russian surveys arrived at a point only 30 miles distant from the farthest English survey from India. It appears from Trotter's account that the English and Russian surveys were never joined; and thus a trigonometrical line right through Asia from north to south remains to be accomplished. For the eastern shores of the Aral and Caspian seas, for the basin of the great river Oxus, for the course of the lesser though important river Attrek, the surveys, if not scientifically complete, are very considerable; many points of consequence have been astronomically determined, and quite 2000 altitudes have been taken with the barometer. Admiral Boutakoff was the first to navigate ships on the sea of Aral. About four-fifths of the elevated steppes of Pamir and of the neighbouring Alai mountains have been roughly surveyed. The old course of the Oxus towards the Caspian has been ascertained, and the oscillations of that river between the Aral and the Caspian in former centuries have been verified.

The exploration of the Tian-Shan mountains was begun in 1856, and has been since continued at intervals by eminent Russian officers. Notwithstanding their efforts, however, the barometrical observations are understood to be of doubtful accuracy, and the estimates of altitudes are approximate only.

Other nations have shared with Russia in the honours of travel in this region; the works of the Hungarian Vambery, the Frenchman Ujfalvy-Bourdon and his talented wife, the American Schuyler, the Englishman Burnaby, shine brightly in the memory of geographers. It was here that the German Schlagintweit lost his life in the midst of his work, a martyr of science. Here also the war correspondents of the newspaper press, Macgahan and O'Donovan, added to our topographical knowledge while following their arduous profession.

It is not to be forgotten that some of the earliest explorers in Western Turkistan were English. The travels of Burnes and Conolly in this quarter formed part of their journeys already mentioned in reference to Afghanistan. Afterwards Conolly in company with Stoddard proceeded to Bokhara, where they both were barbarously killed by the Khan. James Abbott marched through the Merv desert to Khiva and thence to the shore of the Caspian, and has recorded his adventures in one of the most remarkable narratives of modern travel.

VII. Persia.—For Persia, a new map in six sheets has recently been prepared under the orders of the Secretary of State for India, by Major St. John (R.E.), whose reports embody much information regarding the geological formations, the altitudes of some of the mountains, and the physical geography. This map is based in part upon surveys taken for the purpose; there are also the data furnished by the surveyed lines of the Indo-European telegraph, of the political mission through Southern Persia to the south-western corner of Afghanistan, and of the border between Persia and Turkey. Much of the country, however, remains unsurveyed; the altitudes of many points among the mountains towards the Caspian Sea, the Persian Gulf, and the Euphrates basin have been but approximately estimated; and the levels of the depressions called salt deserts are only known roughly. Though some districts remain unexplored, there have been many explorers within the last fifty years, mostly servants of the British Government. Besides the men of the last generation, Morier, Malcolm, Porter, Fraser, and others whose writings are monuments of talent and industry, and above all, Kinneir, the great topographer,—many English travellers have arisen in recent times to illustrate a country so primeval in its associations and yet so fraught with modern interest. Such men are Layard, Goldsmid, Valentine Baker, Eastwick, Mounsey, Macgregor, Bellew, C. E. Stewart. Much light has been thrown on the whole subject by the writings of Sir Henry Rawlinson. The representatives of other nations also have shared in this interesting work; such are the Frenchman Ferrier, the Russian Khanikoff, the German Schindler. The geology of the country has been in part elucidated by the writings of Loftus and Blanford.

VIII. Asiatic Turkey and Arabia.—It will be remembered that the Asiatic dominions of Turkey comprise, 1st, Asia Minor and Armenia; 2nd, Mesopotamia and the adjacent territory; 3rd, Arabia, for the most part; 4th, Syria and Palestine.

For Asia Minor and Armenia the standard map is that by the German geographer Kiepert, based largely on surveys made and information collected in 1838 by Moltke, who was then a major on the general staff, and who has since become so celebrated.

The several archæological explorers starting generally from the Mediterranean coast, have, while exhuming remains or excavating ruins, rendered incidentally great service to geography. The work by Fellowes in 1838, supplemented greatly the knowledge of that time. Later on, the finely illustrated book by the Russian Tchihatcheff threw light on the circumstances of the country. Members of the British Consular Service have, by journeys undertaken for the better preparation of their official reports, promoted the advance of geography; conspicuous among these are Colonel Wilson and Mr. Chermside. Considerable investigations into the topography and geology of the country were made by Richardson and MacCoan. Recent years have been fruitful in travel, consequent doubtless on the awakening of general interest in this region. The Rev. Mr. Davis has published excellent records of two journeys, one relating chiefly to Anatolia, the other chiefly to Cilicia. Burnaby's ride through the central plateau, along the Upper Euphrates, and around Lake Van, is fresh in the public recollection. Freshfield's explorations in the neighbourhood of Ararat added much to the public knowledge of that noteworthy region. Subsequently, Bryce's ascent of this mountain, when, deserted by his native guides, he advanced alone amidst the clouds and darkness to the summit, setting marks on the ice and snow for recognition of the way on his return descent—forms a striking episode in the history of travel.

For Arabian geography during many years the standard authorities were the careful records made by Niebuhr and Burckhardt. They were followed first by Wellsted, and subsequently by Burton with the vivacious narrative of his pilgrimage to Mecca. The northern tracts have more recently been described by the Italian Arconati Visconti, with many large illustrations, and by the German Hüber; also the southern tracts by the Frenchman Halévy, the German Müller, and the Italian Manzoni. The tracts belonging to the Arab tribes under the control of the British settlement of Aden are being fast explored and mapped. The independent Wahabi kingdom around Riad, lying far inland in the heart of the arid peninsula, has been understood for the first time since the wonderful journeys of the Englishman Palgrave and the German Wallin. Collaterally, much information on the subject has been gathered by means of Pelly's journey inwards from the Persian Gulf, by marches conducted under frequent peril of death from thirst. Lastly, one of the most talented among lady travellers, Lady Anne Blunt, has performed much original work in Nejd or Central Arabia, correcting parts of the previously received topography, and determining altitudes with barometrical readings.

For the rivers of Mesopotamia many geographical data have been furnished by the surveys of the Indian Navy. The greatest geographer in this region was Colonel F. R. Chesney, who in 1835 conveyed a steamer in pieces from the Mediterranean shore across the desert, and set it up on the Euphrates. He thence extended his inquiries over all Western Asia and prepared a record which constitutes a monument of amazing industry. The Assyrian excavations, first by Layard and Botta, and afterwards by George Smith, Rassam, and others, have incidentally afforded help to geography. Here also Lady Anne Blunt's journeys have added much to our knowledge.

For the map of Syria and Palestine, data of the best sort are being gradually furnished from the inquiries begun by the Palestine Association in 1832, and from the surveys prosecuted by the Palestine Exploration Fund since 1865, on which Wilson, Warren, Palmer, and other able officers have been engaged. These surveys, which are still in progress, are directed scientifically, and have for their objects among other things the topography, geology, and physical geography of the Holy Land. Already a detailed map on a large scale of Western Palestine has been issued, and an expedition is now in the field for the survey on a similar scale of the region beyond the Jordan. Among the separate and independent explorers, the names of the Frenchman Guerin, and of the Englishmen Porter, Tristram, Burton, Beke, are conspicuous. And a melancholy interest is now aroused when we mention the charming book by Arthur Penrhyn Stanley.

Finally, it will be observed that the Eastern Archipelago, including Java, Borneo, and Sumatra, has not been embraced in this review, as that is by the latest geographers included in Australasia.

Conclusion.—From this rapid review, which is summary only and not exhaustive, it will be seen how much has been accomplished absolutely during the last fifty years, say since 1830, and yet how little relatively. Geographers from most of the European nations have laboured for a common end. A geographical literature has been gathered together, comprising many names besides those which have been mentioned in this paper. Yearly additions are made to our knowledge by the reports of the British Consular Service. The efforts of governments, of societies, and of individuals have been combined. The results have been on the whole commensurate with the cost in money and resources, and with the wear and tear in human life and strength. The great share borne by England and Russia is only proportionate to the magnitude of their stake in Asia; other European nations have also earned a title to geographical fame. Respecting the literature in several languages on this subject, Englishmen may well remark the attention which foreign travellers pay to pictorial illustration.

Hardly any recent English books of travel are so richly illustrated as the works in French by Garnier, in German by Richthofen, in Russian by Radde, in Dutch by Siebold.

Still it must be admitted that the greater part of Asia has not yet been touched by scientific operations on a complete scale. In the whole of Asia, only India, Ceylon, Cyprus, Western Palestine, Caucasia, the Caspian basin, part of Western Siberia, and part of Japan, also many points in the Asiatic coast-line, have been subjected to trigonometrical observation. The altitudes of mountains have been determined only in the Himalayas, the Caucasus, and the Urals by trigonometry. But in many ranges the heights have been approximately ascertained by the barometer. Professional surveys in detail have been completed only in India, Ceylon, Western Palestine, Caucasia, parts of Western and Eastern Siberia, the Tian-Shan region, the greater part of Western Turkistan, Cambodia, parts of Cochin China, parts of Afghanistan, also on certain lines of Persia, Mesopotamia, and Asia Minor. Even in the professionally surveyed territories many defects and imperfections are acknowledged to remain.

Non-professional surveys have been carried out in Japan, in China proper, in parts of Arabia, on the frontiers of Tibet, China, and Burma, and on certain lines in Afghanistan and Beluchistan. Explorations without any actual survey have been made in Mongolia, Siam, the interior of Arabia, most parts of Persia, the Turkoman country, the Ust-urt plateau between the Aral and the Caspian, Manchuria, and in some parts of Afghanistan and Beluchistan.

Though, as already stated, the southern coasts of Asia have been surveyed in sufficient detail for geographical purposes, yet according to the demands of a growing traffic and of maritime resort, these surveys need frequently to be amplified in detail. The old surveys by the Indian Navy were good in their day, reflecting honour on Moresby, Ross, and others; still the Government have ordered a new survey to be made for nautical purposes. A fresh survey, like that done by Nares for the Gulf of Suez, may have to be ordered one day for the whole of the Red Sea, and the Persian Gulf. The British Admiralty are making yearly additions to the surveys of the Chinese coasts, of which the work done by St. John (R.N.) is an example. Whether the Russians will see fit to attempt a scientific survey throughout the Arctic coast of Siberia remains to be seen. This branch of the subject will be best understood on a reference to the paper on oceanic explorations and research, by the highest authority, namely, Sir Frederick Evans, Hydrographer to the Admiralty.

Of geological surveys, the largest example is that in India, which, though far advanced, is far from complete. Very much remains to be done in this respect for the Himalayas. Geological surveys have been made in the Caucasus, the Urals, the Tian-Shan and Altai ranges, Kamchatka, many parts of China and Japan, Cambodia, Ceylon, some parts of Arabia and Persia, much of Asia Minor and Palestine.

But there remain unexplored, parts of the Himalayas, of Afghanistan and Beluchistan, of Arabia, nearly the whole Kuen-Lun region north of Tibet in the very heart of Asia.

Further, the following are among the principal geographical problems still awaiting solution:—The connection of the Tibetan San-po with the Indian Brahmaputra; the existence of mountains connecting the Kuen-Lun range eastwards with the Chinese ranges; the sources and upper courses of the Irawady, Salwen, Mekong, and Hoang Ho, the disposition of the mountains between the Ladakh passes and the Hindu-Kush or Indian Caucasus north of Caubul, near to the culminating region of the entire continent.

When recounting the deeds of explorers and geographers in Asia, we ought to cherish the memory of the Italian Marco Polo, the mediæval traveller whose amazing journeys in Asia have never been equalled even by the great travellers who have succeeded him in modern times. The record of Marco Polo's travels has been recently familiarised to English readers by the learned labour of Henry Yule.

A retrospect of brave and successful achievement should encourage travellers to do and to dare more and more. Of the men thus engaged many indeed have injured their health, and some have lost their lives. But all have been sustained under trials by their sense of natural beauty, by their aspirations for the progress of civilisation, and by their zeal in the pursuit of knowledge. It is the masterful force of these high and noble sentiments which impels them, "tot volvere casus, tot adire labores."

On the Hot-lake District and the Glaciers and Fjords of New Zealand.—By W. LANT CARPENTER, B.A., B.SC.

A Review of Oceanic or Maritime Discovery, Exploration and Research, during the half-century, 1831–81. By Captain Sir FREDERICK EVANS, R.N., K.C.B., F.R.S., Hydrographer of the Admiralty.—After a few preliminary observations the paper continued as follows:—

Maritime discovery may be considered—at least so far as this includes regions within the torrid and temperate zones—to have been exhausted some time before the foundation year of the British Association (1831) had been reached, leaving the areas within the Arctic and Antarctic circles as the sole fields for the discovery of new lands to reward maritime enterprise. In both of these frozen areas much has been effected since the year 1831; more especially within that circle which lies the nearest to our own shores—indeed, the discoveries and explorations in the Polar regions of the northern hemisphere will, from their extent and geographical value, as also from a melancholy interest which attaches to their pursuit, and from causes marking the devotion, courage and self-denying labours of many brave men of various nations, deserve and receive from other hands a separate review.

The exploration of the several oceans and seas, with the concurrent charting of their shores and multitudinous islands, have, to the material benefit of Geography and Hydrography, made vast progress within the last half century; and the attendant researches in several branches of science bearing materially on our knowledge of terrestrial physics have been no less marked in their advance. The term hydrography is perhaps more generally associated with marine surveying, or the art of measuring, mapping and describing the coast-line of a country, and the depths of water in its approaches from seaward; and in this limited sense it was pursued by a few individuals of various nations until the early part of this century. The names of our countrymen Cook, Lane, Dalrymple, Mackenzie, Spence, Huddart, Horsburgh, are well known in this field.

Coming, however, to the period under our immediate review, we find that a total change in the aspects and requirements of hydrography has taken place. Marine surveys have far outreached individual efforts, and have come to be considered national duties, and thus fitting works for the supervision of governments. Vast additions to our knowledge of the sea-board of the globe have of course resulted, but it is in the expansion and in the accuracy of details that the greatest gains have been effected.

The necessity of precision in the establishment of the geographical position in latitude and longitude of the principal ports, and of the prominent coast features of the several oceans, has demanded the employment of astronomical instrumental appliances of the highest order; and especially of marine chronometers for the transportation of accurate time from some well-determined primary meridian. In the interests of ocean navigation the field of meteorology has been sedulously worked, in order to define and chart the various features in the wind and current systems of the globe, as also the paths of those revolving storms, the dread of seamen in tropical and adjacent seas; the sounding of the greater depths of the oceans has been demanded in the interests of commerce and of science; and consequent on the growing change in the fabric of our fleets of ships from wood to iron, charts of the earth's magnetical elements, as distributed over its surface, form part of the necessary equipment for the intelligent seaman. Such, briefly stated, have been the expanding features of modern hydrography.

To proceed now with the subject proper of our review:—

Oceanic or Maritime Discovery, Exploration and Research. Maritime Discovery. —Discovery within the Antarctic circle embraced in the period under consideration, although not prosecuted in recent years, commands interest. Little or nothing was known of the geography of this vast area before the present century; Cook, in his second voyage [1772–5], in order to solve the then much agitated question as to the existence of an accessible Southern continent, traversed a great extent of its cheerless seas between the parallels of 60° and 70°. After leaving the Cape of Good Hope he twice passed within the Antarctic circle, and subsequently was finally stopped by ice on the 71st parallel in the meridian of 107° W. All doubts as to the existence of Southern continental lands, unless in very high latitudes, were thus removed.

One of the earliest discoveries of land in this century was made in 1831, when Biscoe, with two small sailing vessels, engaged on a South Sea sealing voyage, sighted land on the Antarctic circle in 47°–49° E. longitude; it was of considerable extent, but so closely bound with field ice as not to admit of approach within 20 or 30 miles. This is the "Enderby Land" of geographers, justly named after Biscoe's enterprising employers, the British merchants Enderby. Biscoe had been preceded in the Antarctic seas by the Russian navigator Bellingshausen [1820–21], who—after traversing eastward from the meridian of Greenwich, and being repeatedly baffled by ice in his progress southward—discovered Peter Island and the high land of Alexander, both to the S.S.W. of Cape Horn; and also by the bold seaman Weddell, an officer in the Royal Navy, who in command of two small sailing vessels reached, when to the S.S.E. of Cape Horn, the high latitude of 74¼° S., without however in this position seeing land, or indeed very little ice: this is one of the most remarkable voyages made in the Southern seas. In 1832, Biscoe, continuing his mercantile pursuit, discovered to the south of Cape Horn what is known as Graham Land. This high, continuous land, which its discoverer considered to be of great extent, is fronted by a range of islands, on which no living animal was found, except a few birds. Biscoe succeeded in landing on Graham Land, of which he took formal possession. In 1833, Kemp, in a small sealing vessel, observed indications of land some ten degrees of longitude eastward of Enderby Land, with which it is probably continuous, but he was prevented by ice from approaching sufficiently close for examination. In 1839, two of Enderby's whaling ships, commanded by Balleny, discovered to the south of New Zealand the group of three high islands now bearing his name, as also adjacent land "of a tremendous height" covered with snow. Balleny, working to the westward, subsequently sighted a distant land (Sabrina) to the south of King George Sound in Australia.

An impetus was thus given to Antarctic exploration, and between the years 1840–43, government ships from three nations—France, America, Great Britain, under their commanders Dumont D'Urville, Wilkes, and James Ross—had reached high southern latitudes. Their several discoveries of lands were effected chiefly to the south of New Zealand and Tasmania: D'Urville [1840] sighting Adélie and Clarie lands on the Antarctic circle, between the 130th and 140th meridians of East longitude; Wilkes [1840] sighting land at intervals to the east and west of those discovered by D'Urville; both navigators being barred in their approaches by formidable barriers of ice.

James Ross, with his two ships *Erebus* and *Terror* [1841], was more fortunate. Proceeding on the more easterly meridian of 170° E., he sighted in latitude 71° an undoubted Antarctic continent (Victoria Land), which he succeeded in tracing to the latitude of 78°. This volcanic region, formed of stupendous mountain ranges, enveloped from base to summit in perpetual ice and snow, culminated in the active volcano Mount Erebus [77½° S.–167° E.], whose crater top towered 12,367 feet above the sea: a neighbouring crater, apparently extinct, Mount Terror, attains an altitude but little inferior (10,884 feet). From the base of Mount Terror a continuous perpendicular wall of ice was traced to the east for nearly 450 miles. This extraordinary barrier of ice, without rent or fissure, and probably a thousand feet in thickness, presented above the sea an almost unvarying level outline elevated from 150 to 200 feet. Ross describes this icy barrier as "a wonderful and mighty object, far beyond anything we could have thought or conceived." The great distance to which the icy plains extended to the south from this their sea margin, was indicated by an intensely blue sky.

Excepting on two small islands (Possession and Franklin) of Victoria Land, Ross, in common with other discoverers, failed to secure permanent landing on this frozen continent; indeed, the gigantic ice cliffs, thrust out from the solid shores, met also by D'Urville and Wilkes in their explorations to the north and west of Victoria Land, would appear to present insurmountable obstacles to land exploration. The breaking up of these grand walls of ice, forming as they do the tabular bergs common to the southern seas,* combined with the apparently rapid formation of pack ice—found to extend in one season several degrees of latitude northward of that experienced in another season—renders even an approach to Antarctic lands a task of uncertainty and difficulty.

Commercial enterprise so far has not been rewarded by the products of the inhospitable lands or the ice-laden seas within the Antarctic circle.

Oceanic Exploration; Progress of Marine Surveys.—In reviewing the subject of oceanic exploration within the last half century, it is perhaps well to premise that at the close of the great wars—Continental and American [1813–15]—there was not only a revival of voyages, undertaken in the interests of science, to distant lands, but the more laboured and patient examination of lines of sea-coast, within specific boundaries, began to engage the attention of many European states. Between these dates and 1831, under the direction of the Hydrographers of the Admiralty—Hurd, Parry, and Beaufort—our own shores, and their approaches from seaward, were being surveyed by Martin, White, Denham, Thomas, and other skilled naval officers; on the lakes of Canada, in the Gulf of St. Lawrence, and in Newfoundland, Admiralty surveyors under Owen, Bayfield, and Bullock were actively engaged; in the Caribbean Sea and among the West India islands, De Mayne and Richard Owen, in surveying ships of good tonnage, were performing excellent service; so also Smyth and Copeland in the Mediterranean; W. F. W. Owen on the east and west coasts of

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* About the year 1850, ships engaged in the Australian trade, with the view of shortening the time occupied on the voyage, commenced to shape a route through higher latitudes than former experience warranted. Icebergs, occasionally of considerable horizontal dimensions and in immense numbers, were now frequently encountered. In 1866–74, the Admiralty published Ice-Charts of the Southern Hemisphere for the guidance and warning of seamen.

Africa; P. P. King on the shores of Australia; and again this officer, with Stokes and FitzRoy as colleagues, on the wild coasts of Tierra del Fuego and Magellan Strait.

In the Indian Ocean, at the instance of the East India Company, marine surveys were being prosecuted on the coasts of Arabia and Persia; in the Bay of Bengal, from the mouths of the Hooghly to Malacca Strait; and a commencement made of the intricate coast details of the Red Sea. The names of Daniel Ross, Moresby, Haines, Brucks, are conspicuous among the Indian naval surveyors of this period. France had commenced (under Beautemps Beaupré) its admirable coast surveys; so also the governments of Norway, Denmark, Sweden, and Russia. Spain was furnished with the labours of the excellent surveyor Tofiño, who performed so much good work at the close of the last century. The United States of America, by Act of Congress in 1832, were organising a coast survey department, which has subsequently executed hydrographic work on both shores of their continent of the highest scientific and practical value.

With this brief, but necessarily imperfect, sketch of the advances of hydrographical work in the early years of this century, we may here pause, and place on record what had been effected in the interests of navigation and commerce, as represented by the charts of the early portion of the period under review. In 1830, the Hydrographic Department of the British Admiralty published its first catalogue of charts, and although hydrography was then, as now, well represented by well-known private firms, especially in London, and whose labours command the respect of all navigators (the names of Norie, Purdy, Laurie, Imray, Findlay, scarcely require quotation), the results of Government surveys were then beginning to supersede the individual labours of some generations of navigators, and maritime charts to assume an authentic and authoritative character under official responsibility.

A comparison of this official record for the year 1830 with a similar record published in 1880 is instructive as to the progress made during these fifty years. The earlier catalogue described 962 charts, the later described 2699. In the appended footnote are given the particulars of their geographical distribution.*

The progress is of course representative of the labours of most of the maritime states of the world; but this country, notwithstanding its vast shipping interests and its corresponding duties, may view with satisfaction the part it has taken in surveying and charting in every ocean and in nearly every sea. Since the year 1831 (under the Hydrographers of the Admiralty) † unintermitted marine surveys have

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Section		1830.	1880.
I.	Coasts of United Kingdom	51	368
II.	North Sea and coasts	10	53
III.	Baltic Sea	14	63
IV.	North and West coasts of France, Spain, and Portugal	31	52
V.	Mediterranean and neighbouring seas	103	329
VI.	Atlantic Ocean and islands	29	56
VII.	Arctic Seas; North and East coasts of America	57	302
VIII.	Florida Strait, West Indies, Mexico	127	236
IX.	South America—East Coast	21	94
X.	South America—West Coast North America—West Coast	28	190
XI.	Africa, Madagascar, Mauritius, Red Sea	129	231
XII.	East Indies, Arabian Coast to Sunda Strait	154	156
XIII.	Indian Archipelago, China, Japan	154	265
XIV.	Australia, New Zealand	43	204
XV.	Pacific Ocean islands	11	100

† Captains, afterwards Admirals, Sir Francis Beaufort, K.C.B, 1828–54; John Washington, 1855–63; Sir George Richards, C.B., 1864–74.

been maintained on the shores of British North America including Newfoundland; also in our West Indian possessions; and until very recently in the Mediterranean and neighbouring waters; since the year 1837, continuously on the shores of Australia, including a complete examination of the coasts of New Zealand; and since 1842, continuously on the coasts of China, Japan, and among the dangers and the approaches of the China and adjacent seas. Surveying expeditions have visited nearly the whole western seaboard of America, from the Strait of Magellan to Panama, and thence to Behring Strait. The seaboard of British Columbia, with its grand fiords and the valuable island of Vancouver, have been surveyed in detail. In the western Pacific Ocean, in the interests of our Australian colonies, the vast extent of the great barrier reef of Australia has been charted, together with Torres Strait, the eastern part of New Guinea, and its off-lying archipelago; an exhaustive survey of the Fiji group is fast advancing towards completion, and nearly all the dangerous banks in the Coral Sea have been examined.

Passing to Africa, the coast between capes Spartel and Bojador has been charted in ample detail by our surveying ships; so also the extensive seaboard from Cape Verd to the Bight of Biafra, thence to Cape Lopez; and in parts from Walfisch Bay to the Orange River. Between the years 1852–72, Admiralty surveying parties were continuously engaged charting the shores of the Cape Colony, from Orange River on the west to Tugela river on the east; more recently, surveying ships have been engaged on the Zanzibar coast, the seaboard between Pemba, Cape Delgado, and Rás Pekawi being charted in minute detail. Mauritius and its numerous island dependencies, including Rodriguez, have been similarly charted; and consequent on the opening of the Suez Canal, re-surveys of the Gulf of Suez, the Mussawa Channel, and other parts of the Red Sea have been undertaken. These surveys in the Red Sea were made on commensurate scales, to supersede the otherwise excellent charts of the Indian surveyors [1830–4], the details of which did not suffice in the more intricate parts for the conditions of modern steam navigation.

In the Indian seas, the skilled surveyors of the Indian marine preserved a reputation which, by the year 1831, had indeed been well earned, and their labours only ceased when circumstances led to the Crown assuming the government of India in the place of the East India Company. In 1862, the Indian navy ceased to exist. During this period [1831–62] the shores of British India had been well attended to; the Red Sea completed; admirable surveys made of the Maldives and Chagos archipelago; of the coasts of Arabia and the Persian Gulf; of the African coast from the entrance of the Red Sea to Cape Gardafui and thence to Rás Hafun, together with Socotra; while in the Eastern seas, the completion of the Straits of Malacca was a fitting supplement to the honest and laborious work performed in the western approaches to India. In 1874, marine surveys on the shores of British India were again resumed, a special department in Calcutta having been instituted by the Government of India.

If we turn to the labours of other nations, we find that the existing excellent charts of the Baltic and North seas result from contributions of the Governments of all the States situated on their shores; works conducted with the most patient attention to detail: so also on the Atlantic coasts and in the western basin of the Mediterranean and the Adriatic Sea, from contributions by France, Spain, Italy, and Austria. Passing to more distant seas, notably in the Pacific Ocean, we find the ships of the leading maritime states contributing to their hydrography. Spain, and especially the Netherlands, have gradually improved the charts of their Eastern possessions; the Japanese have for some years been engaged (after European models) in charting portions of their coasts; Russia also, in the Gulf of Tartary, in the Sea of Okhotsk, and on the shores of Kamtchatka. It is almost superfluous to descant on the admirable contributions of the United States Coast Survey, still steadily at its work on the shores of the two great oceans. Brazil and Chili have in late years established hydrographic bureaus, and are performing good service on their extensive seaboards. In short, progress, both in patient exploration of the shores of the oceans and in attention to all details in the interests of seamen, is almost without exception a marked feature of our time; though hydrographers cannot but regret that the charts of the extensive Portuguese possessions on the west and east coasts of South Africa are not representative of the prevailing spirit.

Ocean Exploration continued: Determination of Longitude.—One of the greatest advances made in modern hydrography has been that of determining the longitude of any particular spot by the transportation of time from some primary meridian. Previously to the time of Cook, the longitudes of newly-discovered lands were either dependent on the rude results of the ship's run or upon lunar observations: about 1770,* the introduction of the marine chronometer (Cook in his second voyage [1772–5] carried four such watches) enabled the scientific navigator to carry the local time obtained at one port of call to another port, and thus to ascertain the time interval between their meridians, or in other words their difference in longitude, within limits dependent on the steady performance of the watch during the voyage. The value of the marine chronometer as an instrument of precision was soon recognised, and towards the early years of this century had been extensively employed for the measurement of "meridian distances," not only by the leading navigators of the period, but also in the maritime surveys of limited areas then in progress.

Thus we find Smyth in the Mediterranean [1817–24] with five chronometers; Dr. Tiarks [1822–3] establishing the longitude of Pendennis Castle, Falmouth, with twenty-six, and of Funchal, in Madeira, with seventeen chronometers, as measured from Greenwich.† Of our own scientific voyagers, Foster carried seventeen in *Chanticleer*; King [1826] eleven in *Adventure* and *Beagle*; FitzRoy [1831] twenty-two in *Beagle*. "Meridian distances" between places scattered all over the globe were now rapidly accumulating, but there was a want of harmony in rendering their results. The longitude of a place as determined by chronometers is only relative to the longitude of some original starting-point, and it is necessary that the longitude of that original point should be determined either absolutely by astronomical observations, or by accumulated evidence of chronometric connection with a fixed astronomical observatory. From the neglect of this observance, the anomaly frequently arose of two places whose difference in longitude was assured by time measurement, being individually assigned longitudes, the difference between these assigned longitudes being miles wide of the verified amount. The settlement of the longitudes of even well-known and frequented ports was thus a source of embarrassment to hydrographers.

In 1839, Henry Raper, an officer in the Royal Navy of distinguished scientific attainments, whilst engaged in the preparation of his well-known work on navigation, perplexed with the inconsistencies that prevailed, suggested the remedy for this chaotic state of an important geographical question. He assumed that there were then eighteen places fairly distributed over the oceans, the absolute longitudes of which might be adopted as sufficiently accurate, though subject to revision for the purposes of hydrography and navigation; that these places should be known as "Secondary Meridians" (Greenwich Observatory being the primary meridian adopted by English and many other navigators), and that to these secondary meridians the chronometric measurements made in adjacent parts should be referred. For example, the Cape of Good Hope Observatory should regulate the meridians of all the southern coasts of Africa; Madras Observatory, the eastern coasts of India and Bay of Bengal; Batavia Observatory, Java and the adjacent islands; and so on for the eighteen places selected.

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* In the year 1714 an Act was passed offering a reward of 10,000*l.*, 15,000*l.*, and 20,000*l.* respectively, for a method of ascertaining the longitude within 60, 40, or 30 miles. In 1765 an Act was passed which awarded the 20,000*l.* to Harrison, a mechanician who had constructed a timepiece the performance of which in a voyage to Jamaica and back was well within the given conditions.

† Schubert, in 1833, proceeded round the Baltic Sea in a steam vessel with 56 chronometers, reckoning his longitudes from Altona Observatory. In 1845, the Astronomer Royal measured the meridian distance between Greenwich Observatory and Valentia in Ireland with 30 chronometers.

Raper well knew that a regulating (or secondary) meridian had already been adopted by a few scientific navigators and in limited surveys; but his object was the general recognition as a principle, which the state of hydrography then demanded. The unity of design here advocated gradually became uniform in practice, discrepancies were reconciled, and difficulties gradually vanished. By the sustained labours of surveying officers and skilled navigators—and in this the officers of our own Navy have taken a conspicuous share—"meridian distances" have greatly accumulated in the last fifty years. This addition to the common stock, together with contributions rendered by the comparatively recent method of conveying time signals by the electric telegraph, and so determining the meridian distance between two places, has admitted of the eighteen secondary meridians originally proposed being with advantage extended: the Hydrographic Department of the Admiralty, for the harmonious regulation of the meridians of its numerous charts, has for some years adopted fifty secondary meridians. At the present time they are thus distributed:—

On the shores of the Atlantic Ocean and neighbouring seas ..	19 in No.
Indian Ocean and Red Sea	7 ,,
Java, China, and Japan Seas	7 ,,
Australia, Tasmania, New Zealand	9 ,,
Pacific Ocean	8 ,,

Proofs are not wanting of the remarkable accuracy that has been attained in the settlement of the longitudes of distant ports. Within the last five years, under the authority of the United States Government, several places on the American continent and among the West India Islands have been connected by time signals with one of the principal United States observatories, and in some cases with Greenwich, through the electric telegraph. Assuming this method of transporting time to be, perhaps, as practically free from error as may be possible for human ingenuity to devise, the longitudes of the corresponding places, which had been previously adopted by the Admiralty Hydrographic Department for its charts, when reduced to the same spot of observation, compare as follows:—

Jamaica, Port Royal ..	32	seconds of Arc	West	of U.S.	measurement.
Antigua, St. John's	13	,,	East	,,	,,
Barbados, Bridgetown ..	30	,,	East	,,	,,
Trinidad, Port of Spain ..	3	,,	East	,,	,,
Para	46	,,	East	,,	,,
Pernambuco	14	,,	East	,,	,,
Bahia	10	,,	East	,,	,,
Rio de Janeiro	29	,,	East	,,	,,
Monte Video	30	,,	East	,,	,,
Buenos Ayres	4	,,	West	,,	,,

There are grounds for assuming that accuracy of a like character prevails generally over those seas where commerce and its attendant navigation exists; and that any glaring error of longitude position such as would be appreciable in a ship's reckoning, as affecting safety, has ceased to exist over the ordinary navigable parts of the ocean.

This is striking progress in half a century. Reverting to the year 1831, we find then even the longitudes of fixed astronomical observatories in an unsettled state,* and with a few exceptions, chiefly in the West Indies and on the Atlantic seaboard of North America, the longitudes of the chief ports of the world were, judged by a modern standard, in a more uncertain condition.

Oceanic Exploration continued: Deep-sea Soundings.—The exploration of the beds of the oceans in the combined interests of science and commerce is essentially a product of the past fifty years. It is true, that in about the middle of last century the subject of deep-sea temperatures began to attract attention, and several interesting experiments, in what may be even now considered notable depths, were successively made by scientific navigators.† The impetus to deep-sea exploration however, was given by the comparatively recent demand for submarine electrical telegraphic communication between countries separated by seas, or by impracticable land routes.

As a hydrographical fact, when the British Association first commenced its labours, the possible or even probable depths of the great oceans were unknown, and so far as records can be traced, even a depth of 1500 fathoms had not been reached. James Ross, in 1840, during his memorable Antarctic voyage, cleared away doubts as to the practicability of obtaining very deep soundings, and proved that the ocean bed was "fathomable" by obtaining 2678 fathoms some distance to the westward of the Cape of Good Hope. From this time many isolated attempts under varied conditions were made by different navigators to sound the hitherto "unfathomable" sea, and occasionally with success. In 1851–6, the United States Government engaged in a systematic exploration of parts of the Atlantic sea-bed; and by an ingenious device for detaching the heavy sinker attached to the sounding line, small samples of the sea-bottom from great depths were occasionally brought up for examination.

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* Cape of Good Hope Observatory, established in 1821, and maintained by the British Government, was, from astronomical observations, originally considered in longitude 18° 23′ 52″ E. of Greenwich—subsequently it was changed to 18° 28′ 45″. [This observatory is now being connected with Greenwich by time signals through the electric cables joining Durban, Delagoa Bay, Mozambique, Zanzibar, and Aden.] Madras Observatory, established by the East India Company in 1787, was first placed in 80° 19′ 58″ E.; changed in 1815 to 80° 17′ 21″, and so adopted as the primary meridian for the Great Trigonometrical Survey of India. Subsequent astronomers [1831-1852] shifted it to 80° 14′ 19·5″; its longitude by electric telegraph carried on from Greenwich is now accepted as 80° 14′ 41″ E.

Singularly enough the longitude, as received for a great number of years, of the Astronomical Observatory at Lisbon, differs eight seconds of time from a recent determination made through the electric telegraph.

† In 1749. Ellis, on a voyage to the N.W. Coast of Africa, experimented at depths of 650 and 891 fathoms.

1773. Phipps' voyage to Spitzbergen: 780 fathoms was reached.

1780. Saussure, off Nice, in the Mediterranean, observed the temperature at a depth of 320 fathoms.

1816. Scoresby, in the Arctic Ocean, reached 730 fathoms.

— Wauchope, near the Equator, in the Atlantic Ocean, reached 1010 fathoms.

1818. Ross and Sabine *obtained soundings*, 1000 fathoms, in Baffin Bay.

1826. Kotzebue and Lenz, in the North Atlantic, reached 1078 fathoms.

1828-29. D'Urville reached 850 fathoms in the North Atlantic, and 1032 fathoms in the Indian Ocean.

1831. Berard, in the Mediterranean, reached 1063 fathoms.

—See Phil. Trans., 1874.

But now came the demand for telegraphic communication; and a knowledge of the depth of the sea and of the nature of the ground on which his cable was to be placed were matters of practical importance to the telegraphic engineer. In the summer of 1857, preparatory to the first ocean telegraph cable being laid between Valencia in Ireland and Trinity Bay in Newfoundland, a powerful war steamship (H.M.S. *Cyclops*, Commander Dayman) was detached by the Admiralty to carry a line of soundings across the Atlantic on the line of nearest distance between these two terminal ports. The service was faithfully executed; in nearly every sounding specimens of the bottom were obtained, the greatest depth recorded being 2424 fathoms. This deep-sea sounding voyage, with its special duties, was the precursor of many more on the part of the British Government: one followed [1858] between Newfoundland, the Azores, and England, in H.M.S. *Gorgon* (Dayman). In 1859, in the Bay of Biscay and Mediterranean sea, H.M.S. *Firebrand* (Dayman). In 1861, between the Færoe Isles, Iceland, Greenland, and Labrador, H.M.S. *Bulldog* (McClintock). In 1862, on the precipitous slopes of the bank of soundings extending from the western shores of Ireland, in H.M.S. *Porcupine* (Hoskyn), the greatest depth recorded was 2350 fathoms. In the central parts of Red Sea, Gulf of Aden, and in the Indian Ocean [1859–67], by H.M.S. *Cyclops* and *Hydra* (Pullen and Shortland). Subsequently, numerous lines of soundings on projected telegraph routes in the Eastern seas were made by our surveying ships there stationed, and more recently on the seaboards of South America and Eastern Africa by the enterprising companies engaged in laying submarine cables.

The voyage of the *Challenger* [1872–6], mainly designed for sounding at great depths, and which in its course traversed many seas; ably supplemented as it was by that of the exploratory German ship of war *Gazelle* [1874–6]; the sounding cruises of ships of the United States in the Pacific Ocean, and in the Caribbean and other waters adjacent to their Atlantic shores; that of H.M.S. *Valorous* from Ireland to Baffin Bay and back in 1875, and again in the seas between Norway and Greenland by the Norwegian war ship *Vöringen* [1876–8], combined with the works above related, have enabled us to form a clear generalisation of the profound depths, of the comparative shallows, and also of the nature of the surface features and animal life of the beds of the three great oceans.*

Thus far the exploration of the oceans below their surface has been considered mainly as aiding commercial enterprise; viewed from the value to general knowledge, we cannot but be struck with admiration, and indeed with surprise, at the many fields of research that have been thus opened to science. Indeed, we appear to have arrived at a new starting-point in reference to many of our conceptions of the physics of the globe.

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* When graphically rendered on charts by contour lines of equal soundings, the surface of the ocean beds present extensive plateaux, varied with gentle undulations, generally ranging from 17,000 to 12,000 feet below the sea surface. The great Southern Sea, in its unbroken stretch round the globe, is shallower than the seas in the northern hemisphere; neither does this sea, so far as we now know, present those occasional abyssal depths found in the northern oceans. The greatest recorded depth in the Atlantic, 23,250 feet, and in the Pacific, of over 25,000 feet, are respectively north of St. Thomas Island in the West Indies, and east of Yezo Island, Japan.

Oceanic Research: Meteorology of the Sea.—The study of this branch of hydrographical science has been much encouraged in the last half-century. The earlier navigators—of whom Dampier must be mentioned with respect—and their followers through successive generations, diligently recorded their experiences of the winds and currents and other phenomena interesting to seamen, in many and diverse regions. The absence, however, of methodical arrangement, and the necessity of generalisation of the copious information thus diffused, was beginning to be felt in the early part of this century.

Rennell, the well-known geographer, was one of the first to break ground in this direction, and his ‘Investigation of the Currents of the Atlantic Ocean and of those which prevail between the Indian Ocean and the Atlantic’—a work, the labour of the last twenty years of his life [1810–30], published in 1832 by his daughter—has not been surpassed by later research, whether in the copiousness or accuracy of the data employed, or in the industry and critical skill displayed by the author.

Maury, of the United States Navy, following Rennell, was an indefatigable collector of ocean statistics, as was shown between the years 1848–58, by the publication officially, under his superintendence, of 76 out of some 130 contemplated sheets, designed to embrace, “Track, Trade-wind, Wind, Thermal, and Storm and Rain Charts.” These charts were accompanied with descriptive text, which finally, in 1858, expanded to two volumes of some 1300 pages. But Maury’s work on the ‘Physical Geography of the Sea’—originally published in 1855, and which passed through several editions—is that by which his labours are best known, and which assuredly gave an impulse to the study of the subject among seamen. Abounding in speculation—occasionally, it may be observed, not entirely borne out by the logic of facts—this work conveyed, nevertheless, much solid information, and stamped the author as a man of vigorous and original thought.

It resulted from the zeal and earnestness of Maury, that a Maritime Conference —in which the United States of America and nearly all the states of Europe took part—was held at Brussels in 1853, for devising a uniform system of meteorological observations at sea, and “of concurring in a general plan of observations on the winds and currents of the ocean, with a view to the improvement of navigation, and to the acquirement of a more correct knowledge of the laws which govern these elements.” Not the least valuable of the recommendations of the Brussels Conference was that for the general adoption of reliable instruments, especially of barometers and thermometers, to be compared with recognised standards, and their errors thus accurately determined.

Recommendations coming from such a source, and in such a cause, could not but meet with general support; and a meteorological department, attached to the Board of Trade, was established in this country under the accomplished navigator FitzRoy, and transferred in 1866, soon after his death, to the superintendence of a committee selected by the Royal Society. A branch of this department continues in the steady performance of its functions, in collecting and discussing the observations made at sea in ships both of the royal and mercantile marine; and many useful papers, accompanied with illustrative charts, have from time to time been published.* The Indian Government has also done good service in the same direction.

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* Wind and Current Charts, in five sheets, for the Pacific, Atlantic, and Indian Oceans (as also a similar series for the Atlantic Ocean), arranged for the use of seamen, were compiled at the Admiralty, from these and other general contributions from various nations, and published in 1872–9. They embrace, chiefly in a graphical form, most of the leading features in ocean meteorology.

Other maritime nations, especially Holland in relation to its Eastern possessions, have continued to take an active part in following out the Brussels Conference recommendations, and our knowledge has correspondingly been enlarged, but the literature of ocean meteorology—necessarily of a fragmentary character—is becoming voluminous and unwieldy; condensation in the interests of the navigator is desirable: it is to be feared, moreover, that the observations still recorded by seamen are increasing beyond the powers available for their complete discussion. Another generation may perhaps reap the full harvest sown in the present one.

Oceanic Research continued: Revolving Storms.—One of the most useful inquiries in Ocean Meteorology, especially as affecting the safety of ships and their crews, has been that on the nature of "Revolving Storms," familiarly known in the seas which they devastate either as hurricanes, or cyclones, or typhoons. On 10th August, 1831—a few weeks, it may be observed, before the inaugural meeting of the British Association—a severe hurricane visited the island of Barbados in the West Indies, when, from the violence of the wind, 1477 persons lost their lives in the short space of seven hours. An officer of Engineers, Lieut.-Colonel Reid, was soon afterwards employed in the re-establishment of the Government buildings blown down in this storm: his attention was thus directed to the surrounding conditions, and led him to seek for accounts of previous storms, "in the hope of learning something of their causes and mode of action."

In 1838, Colonel Reid published the results of his investigations, 'An Attempt to Develop the Law of Storms, by means of facts, arranged according to place and time, and hence to point out a cause for the variable winds, with the view to practical use in Navigation,' a work which at once became a standard authority. In it he bore testimony to the valuable labours of Mr. Redfield, of New York, whose papers published a few years previously, on 'The Hurricanes and Storms of the West Indies and Coasts of the United States,' were considered by him as the first to convey any just opinion on the nature of hurricanes. Public opinion, in which the Government of the day shared, recognised the practical outcome of these investigations, and the attention of the governors of all British Colonies was directed to the furtherance of the study of these storms.

Piddington, President of the Marine Court of Inquiry at Calcutta, followed in Reid's steps, taking up the cyclones of the Indian and China seas. He published numerous memoirs on these storms [1839–51], as also useful practical rules for seamen. Dr. Thom, in 1845, published a similar inquiry, and for many years Mr. Meldrum, the director of an observatory at Mauritius, has further contributed to the nature of these cyclones.* With a zeal worthy of all praise, these several writers diligently collected facts, and in endeavouring to develop the laws by which such storms are governed, demonstrated the dangerous consequences of neglecting the indications by which they are invariably preceded, and pointed out to the seamen the means by which they may be generally avoided. Seamen have repaid these gifts by habits of closer attention, and in rendering more accurate records of the striking atmospheric changes and movements of the barometer, experienced in these remarkable tempests.

Statistics are still being collected in relation to revolving storms, and some divergent points from the views of Reid and his followers have been raised, but to the broad principles laid down by these original investigators on the "revolving storm" proper of tropical seas little has been added, and those principles and their deductions certainly deserve the confidence of seamen.

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* Dove's 'Law of Storms,' considered in connection with the ordinary movements of the atmosphere (an English translation), was published in London, 1862.

Temperature of the Sea: Oceanic Circulation.—Among the subjects pertaining to oceanic research, and appropriate for mention in this review, as resulting from the deep-sea sounding operations of late years, are (1) the temperature of the oceans at successive and great depths, and (2), as a necessary consequence of these varying temperatures, the constant circulation of oceanic waters. These are matters of deep and varied interest, connected as they are with the great movements of the surface waters, and their bearing on climate, and the distribution of animal and vegetable life, as also on the art of navigation.

Early observers noted the decrease of temperature with the increase of depth, and so low a temperature as 36° to 37° F. had been recorded by Lenz in Kotzebue's voyage [1823–26], nevertheless it became generally accepted as a physical fact, after the Antarctic explorations of D'Urville, Wilkes, and Ross, that in *all* open seas a uniform temperature of about 39° F. prevailed below a certain depth. Instrumental imperfections had much to do with this erroneous deduction.

An especially valuable series of deep-sea explorations, undertaken at the instance of the Royal Society, was commenced in 1868 by Dr. Carpenter and Messrs. Wyville Thomson and Gwyn Jeffreys, the Admiralty assisting by placing at their disposal small war vessels. These operations, continued to 1871, embraced deep-sea soundings, serial temperatures of the sea-depths and dredging of the sea-bed: they extended along the Atlantic seaboard from the Færoe Islands to the shores of Spain and Portugal, and included both basins of the Mediterranean. The results of these explorations were of great value to many branches of science, and led directly to the *Challenger* expedition. The serial temperatures gave unexpected results; their discussion opened up the subject of oceanic circulation at great depths—which had for some time lain dormant—and formed the matter for much lively controversy, as well as for many valuable essays.*

The cause of the low temperature found in the depths of tropical seas had been discussed by Humboldt in the early part of this century. He considered that the existence of the cold layers in low latitudes proved the existence of an under-current flowing from the poles to the equator; and that in the tropical seas which cover the cold waters from Arctic regions, the mass of waters is in a state of movement. D'Urville [1833], Arago [1838], Lentz [1847], extended the discussion.†

The special attention paid to the construction of the deep-sea thermometers employed in the *Challenger* and kindred expeditions, and the painstaking care bestowed in their extended use, have contributed greatly to clear up doubtful points. We are now fairly assured that in seas within the tropical and temperate zones, provided any given area is not cut off by submarine barriers from a supply of polar water (as is the Mediterranean Sea), the sea-bed is covered with a thick stratum of water the temperature of which is confined between 32° and 35° F. Within the Polar areas this temperature falls to 28°. That this cold stratum in the Atlantic Ocean extends from the Arctic to the Antarctic seas, and that in the equatorial regions of this ocean it rises nearer the surface than in the higher latitudes. That in the Pacific Ocean this stratum extends from the Antarctic seas to Behring's Sea, but without any uprising of the cold undercurrents at the equator as in the Atlantic.

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* See especially papers "On the Physical Cause of Ocean-currents," in the 'Philosophical Magazine' for 1874, by Mr. Croll of the Geological Survey of Scotland; and a Lecture by Dr. Carpenter "On the Temperature of the Deep-sea Bottom, and the Conditions by which it is determined," 'Proceedings of Royal Geographical Society,' 1877.

† See an admirable, and to the time exhaustive, paper on the "Temperatures of the Sea at different Depths," in the Phil. Trans. for 1874, by the Professor of Geology at Oxford (Mr. Prestwich).

We have thus in the Atlantic Ocean a deep underflow of glacial water from each pole to the equator. In the Pacific, the cold stratum must be derived from Antarctic sources, for the opening of Behring Strait is too small to admit of an appreciable efflux of Arctic waters. Similarly, in the Indian ocean basin, the cold stratum is derived from Antarctic sources, for a temperature of 33·5° F. underlies the hot surface waters of the Arabian Gulf.

In an inland sea—like the Mediterranean—where a submarine barrier prevents the entrance of the colder layers of oceanic waters, different conditions prevail. The results of observations made by Saussure [1780], by D'Urville [1826], Berard [1831], in the Mediterranean were different from those similarly obtained in an open sea. These early observations have been fully confirmed by those of Aimé [1840–44], Spratt [1845–61], Carpenter [1870–71], proving that in this inland sea, almost an ocean in its extent and depth, the variations of temperature in the surface waters cease at about 1000 feet; and that below that line a uniform temperature of about 55° F. (or the mean winter temperature of the surface) prevails even down to the profound depths of 12,000 feet.

Connecting these facts with oceanic circulation:—of the general movements of the surface waters of the oceans, our knowledge as derived from the observations of seamen is now fairly clear, but of the laws which regulate their connection with the movements of the deep waters there is much uncertainty. This much, however—to adopt the conclusions of an able investigator *—appears assured; that although the ultimate course of the great surface currents may be influenced and determined by the action of the prevailing winds and by the movement of rotation of the earth; those currents which originate or acquire additional force in the equatorial and Polar seas, are intimately connected with the surging-up of Polar waters in the great oceans and of tropical waters in Arctic and Antarctic seas.

Oceanic Research continued: Tidal Investigations.—Connected with oceanic research, there is no subject which has been more indebted to the support of the British Association than that of the "Tides." At its first meeting, the late Sir John Lubbock was requested "to furnish a statement of the means which we possess, or which we want, for forming accurate tables for calculating the time and height of high water at a given place." At the following meeting [1832] Mr. Lubbock rendered a Report on the Tides. It was brief, but conclusive as to the deficient means then existing in this country even for predicting the tides at the two great mercantile ports of London and Liverpool. He stated "that in the earliest years of the Royal Society, some attempts were made to set on foot observations of the tides by some of the active members; but these phenomena have long ceased until lately to excite any attention whatever in this country." Also that "works of navigation and sailing directions supply much information with respect to the velocity and direction of the currents; while the time of high water appears to have been carefully ascertained at very few points only on the earth's surface." As to the general complicated phenomena of the tides, he recalls Laplace's opinion as to certain questions being "la plus épineuse de l'Astronomie Physique," and concludes the report by giving his own opinion that "there is no branch of physical astronomy in which so much remains to be accomplished."

Active efforts appear to have soon followed to remedy the deficiencies referred to; systematic tidal observations had been established at the Royal Dockyards in 1831; during the month of June 1834, and again in June 1835,* simultaneous tide observations were made at the several coastguard stations in Great Britain and Ireland. Mr. Lubbock, with great devotion, applied himself to a discussion of the movements of the London and Liverpool tides; while the late Dr. Whewell (whose "Essay towards a First Approximation to a Map of Co-tidal Lines" was published in the Phil. Trans. for 1833) applied himself to the motion of the "tide wave" in different parts of the ocean, the laws of the "diurnal inequality" of the tide, and the comparison of the observed laws of the tides at certain places with the theory. The numerous papers by these able investigators, published in the Phil. Trans. of the Royal Society and British Association Reports, extending from 1832 to 1851, are of permanent value.

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* Prestwich on "Temperatures of the Sea at different Depths," Phil. Trans., 1874.

Taking up the subject from its practical side, the Admiralty published its first official tide-tables in 1833, in which the times and the heights of high water were predicted for the ports of Plymouth, Portsmouth, Sheerness, and London; these tables have since been continued annually. In 1835, the predicted tide-tables included six additional ports (one being Brest, on the coast of France), and to afford information as to the processes employed in prediction were accompanied by tables of corrections—resulting from Mr. Lubbock's theoretical investigations—necessary to be applied to a constant value of time and of height as determined from a series of observations made at any particular port.

The standard ports have now increased to twenty-four, and constants of time for other places on our own coasts, which can be referred to these standard ports, extend to 180. The modest beginning of official tide-tables in 1833, contained in twenty pages, has now expanded to over 230 pages, which includes, in addition to all tidal information connected with the British Islands, the ascertained establishment for upwards of 3200 places on the globe, accompanied with the rise of tide at springs and neaps.

In 1848–51, copious reports upon the tides in the Irish Sea and upon the tidal streams of the North Sea and English Channel were furnished by the Admiralty surveyor, Captain F. W. Beechey, after a long series of observations afloat, and published in the 'Transactions of the Royal Society.'

The demands of science have kept pace with the acquisition of recorded facts. In 1867, at the instance of Sir William Thomson, a committee of the British Association was appointed "for the purpose of promoting the extension, improvement, and harmonic analysis of tidal observations." Reports were made in 1868, 1870, 1872, and 1876. Both in relation to theory and practical usefulness, these reports mark great progress; the laws of tidal movements have received considerable development, and their analysis so far advanced that mechanical appliances based thereon have been prepared and successfully employed to facilitate the prediction even of the complicated tides of the Indian seas.†

A second committee appointed in 1877, for the purpose of obtaining information respecting the phenomena of the stationary tides in the English Channel and in the North Sea, is now pursuing its useful labours.

Charts of Magnetic Elements. Concluding Remarks.—Reference was made in the early part of this review to charts of the earth's magnetical elements forming a necessary part of the equipment of seamen engaged in the navigation of iron ships. It would not, however, fall within the scope of this review to record the advances made in our knowledge of the "magnetism of the earth," though it must not be forgotten that it was in the prosecution of oceanic discovery and exploration—and markedly so in the last half-century—that the greatest additions were made.

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* On this last occasion, with the combined action of other governments, simultaneous tidal observations were made along the shores of Europe from Gibraltar to the North Cape of Norway, and along the coasts of North America from the Mississippi mouth to Nova Scotia.

† In connection with the Great Trigonometrical Survey of India, valuable series of tidal observations have been made at Karáchi, Bombay, and are in progress at other ports in British India.

In 1831, James Ross, in an Arctic voyage of discovery, observed in a region where the magnetic needle stood perpendicular; in other words, he observed on the magnetic pole of the northern hemisphere. In 1839–43, the same intrepid voyager, when engaged in a magnetic survey of the Antarctic seas, during the expedition more than once referred to, observed the high dip of nearly 89°, and thus indicated the near position of the magnetic pole in the southern hemisphere. Since that period, the several surveying expeditions which have left our shores, as also individual navigators, have contributed to one or more of the elements—this in a marked degree by the skilled officers of the late *Challenger* expedition. The rendering of charts recording the magnetic forces acting at the surface of the oceans of undoubted accuracy has thus been gradually attained.

In conclusion, it will doubtless be admitted that this review has shown, that when engaged on any of the branches of knowledge therein recorded, the members of the naval profession have with zeal and intelligence actively shared in the object for which the British Association was established, "the advancement of Science."

On the River Gambia.—By R. E. Cole.

PROCEEDINGS OF FOREIGN SOCIETIES.

International Polar Conference at St. Petersburg.—The International Polar Conference, which in 1879 met at Hamburg and in 1880 at Berne, was held this year at St. Petersburg, in the Central Physical Observatory, under the presidency of M. H. Wild, the Director. The following delegates from foreign countries were also present:—from Denmark (which will establish a Polar station at Upernavik in Greenland), Captain Hofmeyer, Director of the Meteorological Institute at Copenhagen; from Norway (which will found a station at Bosskop, Finmark), Professor Mohn, Director of the Meteorological Institute at Christiania; from Austria-Hungary (which will have an observatory on the Island of Jan Mayen), Count Wilczek and Lieutenant de Wohlgemuth, who is to be the leader of the Austrian expedition; from Russia (which will have stations both at the mouth of the Lena and in Novaya Zemlya), Professor Lenz, President of the Physical Section of the Imperial Geographical Society of St. Petersburg, and M. Jurgens, who, as we have before reported, is to be the head of the Lena expedition; from Sweden (which will undertake an expedition to Spitzbergen), Professor Wijkander, of Lund; from France (which may, perhaps, have a station at Cape Horn), Professor Mascart, Director of the Central Meteorological Bureau at Paris; and from Holland, Dr. Snellen, Director of the Meteorological Observatory at Utrecht.

The following is a brief *résumé* of the proceedings at the different meetings of the Conference:—

August 1st.—In addressing the Delegates present, M. Wild, the President, dwelt upon the great loss which science in general, as well as the International Polar Conference, had suffered by the recent death of Lieutenant Karl Weyprecht, the promoter of the project for simultaneous observations in the Polar Regions, and he afterwards gave an account of the labours of the Commission since the meeting of the Conference at Berne in August of last year.—The programme of the present meeting having been arranged, the first business was the period of the observations and their frequency. It was determined that they should be commenced by all the expeditions in the Polar Regions, as well as those in the temperate zones, as soon as possible after August 1st, 1882, and that they should be continued as far as practicable until September 1st, 1883. All meteorological and magnetic phenomena will be observed hour by hour, and on the 1st and 15th of each month magnetic observations will be made every five minutes during the twenty-four hours, and every twenty seconds during one hour, which will be previously fixed, mean time of Göttingen being adopted in all cases. The latter class of observations is intended to make us thoroughly acquainted with magnetic perturbations and storms and their connection with aurora borealis.—Some further discussion took place with regard to the observations to be made at all stations alike, in order to secure the scientific success of the enterprise; and the principles were laid down, and to some extent also the methods and instruments to be employed, in order to guarantee exactness and uniformity in all the meteorological observations.

August 2nd.—The members of the Conference visited the meteorological and magnetic observatory at Paulofsk, and there discussed the best descriptions of apparatus. They inspected in detail the arrangements that have been made at the observatory for studying the instruments intended for the use of the Russian expedition to the mouth of the Lena.

August 3rd.—Deliberations took place on the subject of magnetic observations, which in the Polar Regions are attended with difficulties unknown in the temperate zones. These arise not only from the greatness of the cold, but above all from the feebleness of the horizontal intensity of terrestrial magnetism, as well as the frequent and great perturbations, which in those regions make such observations very troublesome and delicate.

August 4th.—The Delegates were occupied with discussions on the subject of aurora borealis, and on certain observations, the taking of which is recommended to the expeditions without being insisted upon—such as observations of the temperature of the soil, of evaporation, of terrestrial galvanic currents, of atmospheric electricity, &c.—At the instance of Count Wilczek it was resolved (1) to found, if possible, a special publication to bring more quickly to the knowledge of the scientific world, as well as of the leaders of the various expeditions, the results achieved from time to time, &c.; (2) to leave behind, where practicable, the buildings and other of the equipments of expeditions likely to be useful to future investigators in the same branches of science, and to take all possible precautions for their preservation; and (3) to endeavour to make arrangements with railway and steamer companies for the reduction of the cost of passages and transport.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

AFRICA.

Oates, Frank.—Matabele Land and the Victoria Falls. A Naturalist's Wanderings in the Interior of South Africa. From the Letters and Journals of the late Frank Oates, F.R.G.S. Edited by C. G. Oates, B.A. London (C. Kegan Paul & Co.): 1881, 8vo., pp. xliii. and 383, maps, portrait, coloured plates, and woodcuts. Price 21s.

The hope expressed in the Obituary Notice of the late Mr. Frank Oates (Journal R. G. S., vol. xlv. p. clii.), that his notes might hereafter be published for the benefit of science, is now fulfilled, after a delay of nearly six years, caused chiefly by the necessity for a thorough examination of his somewhat extensive Natural History collections. This interval must have materially affected the general interest attaching to the narrative, as events in South Africa have attracted much attention since 1875, and the scene of the author's experiences has been described by many writers, of whom Dr. Holub may be specially mentioned. The permanent value of the book will, however, rest upon the scientific appendices.

Mr. Oates started from Durban with his brother, Mr. W. E. Oates (from whose sketches the greater part of the plates and engravings are taken) in April 1873, reaching Shoshong at the end of the following July, having followed the usual route by Pietermaritzburg, Wesselstroom, and Pretoria. In August he visited Tati (the importance of which, on the map, strangely contrasts with the evidently truthful pictorial representation of a few miserable huts, p. 30), and on the return of his brother to the coast, started for Gubuleweyo, the residence of Lobengula, reached in mid-September. Frustrated in an attempt to reach the Zambesi by a more direct way than the usual Tati trade route, Mr. Oates struck north-east through Inyati across the Changani, Umvungu, and Gwailo rivers to the Umgwanya, returning on 16th November by the same road to Gubuleweyo. The journey from Shoshong to Tati, and from the latter place to the furthest point reached on the Umgwanya, is shown on two special route maps (scale, 12 statute miles to the inch), with hunting tracks, on which minute physical features are laid down, with observations on distribution of game, which was abundant at the point where the return commenced. After a stay at Lobengula's, the traveller again visited Tati, at the end of February 1874, and it was not until the November following that he was enabled to make his fourth and final start for the Zambesi from that place, having in the interval made two ineffectual attempts with that object, besides various excursions on the Impakwe, Ramaqueban, and Temowke rivers, and further visits to Shoshong and Gubuleweyo. His successful journey was practically by the same road as that by which Dr. Holub returned, and is shown on a 3rd route map, on the same scale. On the Matengwe, east of the Saltpans, he met Mr. Selous, then also returning, falling in with Dr. Bradshaw at Christmas near the Pantamatenka; and on 31st December he reached the world-renowned falls of Metse-a-tunya or Victoria. His visit was at the very height of the rainy season, and it is a subject of regret that he made no special entries in his journal as to the actual condition of the falls at that time, as all other published accounts appear to have been given by visitors in the dry season. He made, however, some drawings, from which two of the illustrations are taken.

Returning to the Pantamatenka on 13th January, 1875, the journey home had scarcely commenced before Mr. Oates succumbed to fever on 5th February. His collections and notes were brought home by Mr. Gilchrist, who on the very day of the traveller's death had started from England with his brother, Mr. W. E. Oates, intending to join him in South Africa.

Mr. Oates's journeys were made, as will have been noticed from the above remarks, in a country much frequented by travellers, hunters, traders, and missionaries; but his observant nature and the length of time he spent in various localities impart a special value to many of his notes, even though they are upon subjects and localities supposed to be well known. The illustrations, moreover, bear the impress of accuracy, and will doubtless be found of future use.

The Appendices are as follows:—

1, Ethnology: by the late Professor Rolleston, on some Bushman crania and bones collected by Mr. Oates between the Tati and Ramaqueban rivers.

2, Ornithology: by Mr. R. B. Sharpe, of Brit. Mus., on the birds collected (named originally by Captain Shelley). 213 species are enumerated, including a new species of *Prionopidæ* (*Bradyornis Oatesi*, described and figured); no special Zambesi Avi-fauna is considered likely to exist, and so far as is now known, its affinities are with South-Western Africa.

3, Herpetology: by Dr. Günther, of Brit. Mus. (descriptions and figures of two new species of snakes, *Coronella tritœnia* and *Dryophis Oatesi*).

4, Entomology: by Professor Westwood, containing references to or descriptions of 75 species of Diurnal *Lepidoptera* (including several new), 5 new species of *Heterocera* (with improperly interpolated descriptions of others in no way connected with Mr. Oates's journeys), a new genus (*Derosphærius*, in the *Helopidæ*), and two new species of *Coleoptera*, with various notes on insects of that and other orders, including the "Tsetse" fly, originally described by Professor Westwood, and now re-figured, with details, Pl. G. fig. 2, Pl. H. fig. 5, 5*a*, and 5*b*.

5, Botany: by Professor Oliver, including descriptions by Mr. J. G. Baker of a new *Anthericum* and a new *Adiantum*.

6, List of Makalaka words and phrases, from one of Mr. F. Oates's note-books.

These appendices are illustrated by 10 coloured plates (the Entomological ones from the pencil of Professor Westwood).

Besides the 3 route-maps above mentioned, a general map of South-Eastern Africa is given (68 miles to the inch), from the mouth of the Zambesi to Durban, on which the corrected position of Shoshong duly appears.

AUSTRALIA.

Leichhardt, L.—Dr. Ludwig Leichhardt's Briefe an seine Angehörigen. Herausgegeben im Auftrage der Geographischen Gesellschaft im Hamburg von Dr. G. Neumayer und Otto Leichhardt. Mit einem Anhage: Dr. Ludwig Leichhardt als Naturforscher und Entdeckungsreisender, von Dr. G. Neumayer. Hamburg (Friederichsen): 1881, 8vo., pp. 215, map, portrait. Price 5*s*.

These letters of the lost Australian explorer, edited by his nephew in conjunction with the late Director of the Flagstaff Observatory at Melbourne, are divided into three sections, of which the first two are only of biographical interest, the third containing those written from Australia (Oct. 1841 to April 1848). Dr. Neumayer also contributes a sketch of the scientific career of the discoverer, of whom a portrait is given. The map (by Perthes; scale 1 : 10,000,000) is of all Australia, and shows Leichhardt's routes of 1845 and 1848, with those of all other expeditions approaching the region where he is supposed to have met with his death.

GENERAL.

Jackson, James.—Liste Provisoire de Bibliographies Géographiques Spéciales. Paris (Delagrave): 1881, 8vo., pp. 125.

This useful little work, published by the Société de Géographie, contains 559 titles and other particulars of books and papers containing bibliographical references of a geographical nature, and is intended to be the commencement of a collection of similar scattered lists, which when complete will show at a glance the geographical literature of each country or its component parts up to date.

No references are made to the greater part of the best known European countries (such as France, Germany, and Great Britain), on account of the mass of well-known and easily accessible literature; but if the excellent idea of the work is eventually carried out, these will necessarily have to be incorporated in it.

The references now given are arranged geographically, and the number of items contained in each bibliography quoted is given, with an index of authors running over the whole.

Ruge, Dr. Sophus.—Geschichte des Zeitalters der Entdeckungen. Berlin (Grote): 1881, 8vo., pp. 128, maps, illustrations. (*Williams & Norgate.*)

This first part of a History of the Age of Discoveries is No. 36 of the more comprehensive 'Allgemeine Geschichte in Einzeldarstellungen,' edited by Wilhelm Oncken, with the aid of 21 other scientific and literary authorities, forming the commencement of the 9th part of the 2nd chief section (price 3*s*. a part; 6*s*. to non-subscribers). Various points of early historical geography are discussed in it, such as the voyages of the brothers Zeno, Marco Polo, Prince Henry the Navigator, Vasco da Gama, and other Portuguese discoverers, &c.

Among the larger plates and facsimiles are the Catalan map of the world of 1375 (in the Paris National Library), the map of the world of Fra Mauros, 1459, a facsimile of the 1513 Strasburg edn. of Ptolemy's map of the world, and the west coast of Hindostan, showing the Portuguese voyages of discovery. In the text, are a map of Africa from a sea-chart of 1351 (now in Florence), a map of the voyages of the Zeni, and other illustrations of geographical interest. A map of the Mongolian states of the 13th century, to illustrate the travels of Rubruk and Marco Polo, is deferred to the next part.

Tissot, ——.—Mémoire sur la Représentation des Surfaces, et les Projections des Cartes Géographiques. Paris (Gauthier-Villars): 1880, 8vo., pp. 337, Tables, pp. 60. (*Dulau:* price 7*s.* 6*d.*)

The author discusses mathematically the distortions of surface in maps, passing in review the formulas hitherto employed in their construction, and giving numerical tables of the various projections. He comes to the conclusion that he can replace those now in use by more advantageous methods, which permit the representation of considerable areas (such as either hemisphere) with less distortion than heretofore.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Alpine Club.—The enlarged Alpine Club Map of the Swiss and Italian Alps, on eight sheets. Scale 1 : 190,000 or 2·5 geographical miles to an inch. London: published by Longmans, Green & Co., and E. Stanford, July 1st, 1881. Price 1*s.* 6*d.* each sheet.

Austrian Government.—Specialkarte der Oesterreichsch-Ungarischen Monarchie. Scale 1: 75,000 or 1 geographical mile to an inch. Military Geographical Institute, Vienna, 1881. Price of each sheet 1*s.* 4*d.* (*Dulau.*)

The following sheets are just published:—Zone 3: Col. XII. Turnau. Col. XIII. Hohenelbe. Zone 8: Col. XIII. Jglau. Zone 11: Col. XX. Neusohl und Altsohl. Zone 18: Col. XI. Hüttenberg und Eberstein. Zone 19: Col. VIII. Ob. Drauburg und Mauthen. Col. IX. Bleiberg und Tarvis. Col. X. Villach und Klagenfurt. Col. XI. Völkermarkt. Zone 20: Col. IX. Flitsch. Col. X. Radmannsdorf. Col. XI. Eisenkappel und Kanker.

Baur, C. F.—Neue Karte von Europa, dem Mittelländischen Meer, Nord-Afrika, Egypten, Syrien, Klein-Asien, Kaukasien und dem Schwarzen Meer. Scale 1 : 3,000,000 or 41·6 geographical miles to an inch. 6 sheets. 5th edition. Chromolith. Maier, Stuttgart. Price 3*s.* (*Dulau.*)

Curtius, E., & Kaupert, J. A.—Karten von Attika. Auf Veranlassung des Kaiserlich Deutschen Archäologischen Instituts und mit Unterstützung des Königlich Preussischen Ministeriums der geistlichen, Unterrichts- und Medicinal-Angelegenheiten aufgenommen durch Offiziere und Beamte des K. Preussischen Grossen Generalstabes herausgegeben von E. Curtius und J. A. Kaupert. Mit erläuterndem Text. Heft I. Athen und Peiraieus. Dietrich Reimer, Berlin, 1881. Price 12*s.* (*Dulau.*)

Keller's Zweiter Reisekarte der Schweiz. Scale 1 : 440,000 or 6·2 geographical miles to an inch. Zurich, 1881. Price 5*s.* (*Dulau.*)

Swedish Government.—Sveriges Geologiska Undersökning. Scale 1 : 50,000 or 1·4 inch to a geographical mile. Sheets:—73. Gustafsberg. 74. Helsingborg. 75. Landskrona. 76. Engelholm. 77 and 78. (on one) Kullen and Höganäs. 79. Norsholm. Scale 1 : 200,000 or 2·7 geographical miles to an inch. Sheet. 6. Nissafors. Stockholm, 1881. (*Dulau.*)

Wagner, J. E.—General-Karte vom westlichen Böhmen. Scale 1 : 220,000 or 3 geographical miles to an inch. Chromolith. Kytka, Prag. Price 1*s.* 6*d.* (*Dulau.*)

ASIA.

Guérin, Victor.—Carte de la Palestine par Victor Guérin, Agrégé et Docteur ès lettres; auteur de la Description Géographique, Historique et Archéologique de la Palestine. Scale 1 : 250,000 or 3·4 geographical miles to an inch. En vente à la Librairie de la Société Bibliographique, Maurice Tardien, Directeur. Paris, 1881. Price 6*s.* 6*d.* (*Williams & Norgate.*)

Petermann's 'Geographische Mittheilungen.'—Reiseroute des indischen Punditen A-a im Gebiet des Oberen Irawaddy 1879–80. Nach dem Feldbuch des Erforschers zusammengestellt von Capt$^{n.}$ J. E. Sandeman. Scale 1 : 1,200,000 or 16·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 14. Justus Perthes, Gotha. (*Dulau.*)

——— Temperatur-Verhältnisse des Russischen Reiches nach H. Wild. Scale 1 : 60,000,000 or 820 geographical miles to an inch. 6 maps on one sheet. Petermann's 'Geographische Mittheilungen,' Jahrgang 1881, Tafel 13. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Kiepert, Dr. Richard.—Otto Schütt's Aufnahmen und Erkundigungen im Südwestlichen Becken des Congo, 1878–79. Redigirt und herausgegeben von Dr. Richard Kiepert. 2 sheets. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Beiträge zur Entdeckungsgeschichte Afrika's IV., Taf. 2 and 3. Dietrich Reimer, Berlin, 1881. (*Dulau.*)

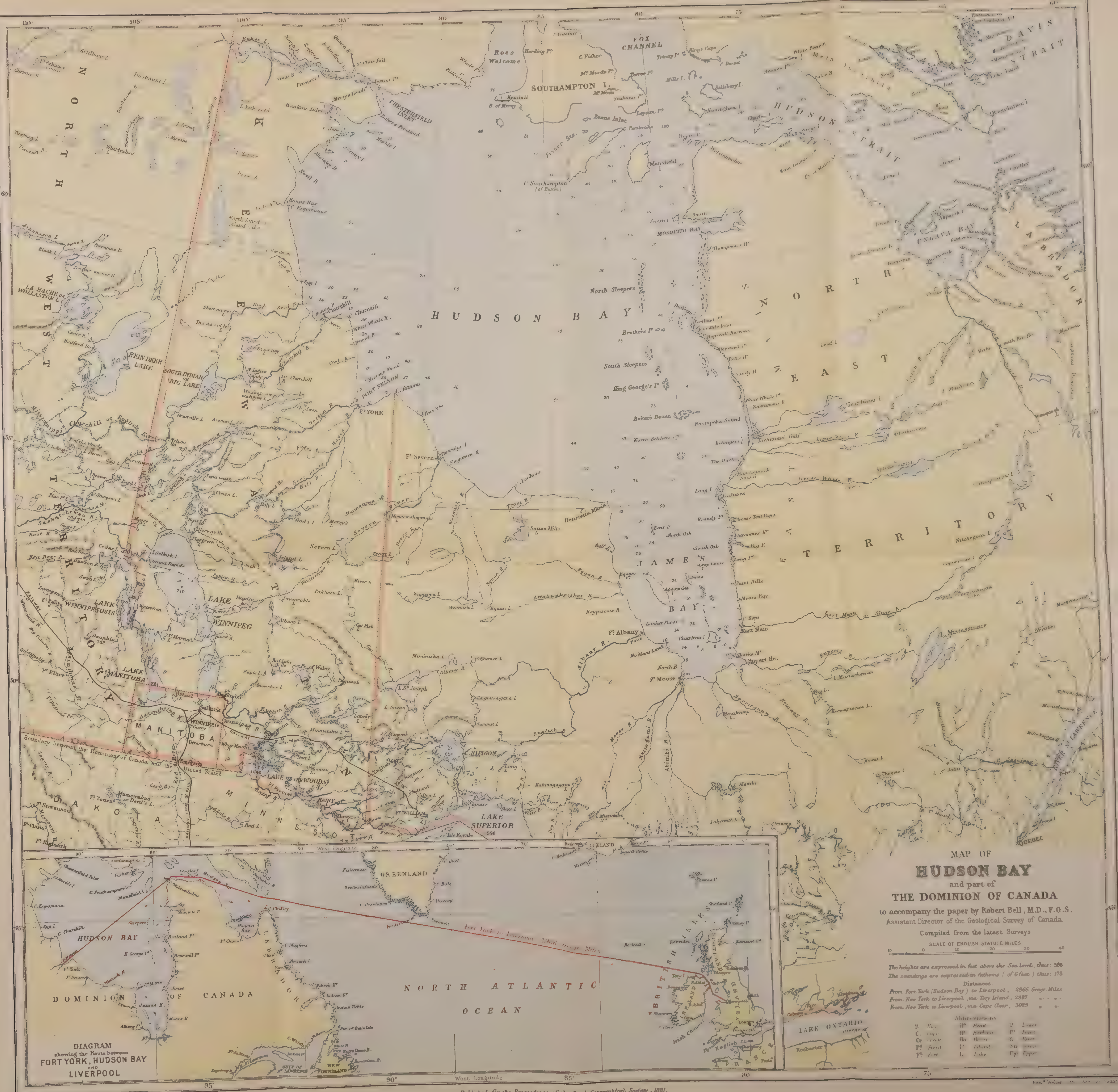
Wangemann, Dr.—Geographisch-geschichtliche Uebersichtskarte über die evangelische Missionsarbeit in Süd-Afrika. Scale 1 : 3,250,000 or 45 geographical miles to an inch. Chromolith. Berlin, 1881. Price 3*s.* (*Dulau.*)

Carte de la France africaine, indiquant les rélations du Soudan avec nos possessions du Sénégal et de l'Algérie et la position géographique des propriétés de la Société anonyme la Colonie civile du Sahara ; ainsi que le tracé des grandes voies de communication par caravanes, fleuves et chemins de fer à créer. Paris, 1881. (*Dulau.*)

AMERICA.

Baur, C. F.—Neueste Karte von America mit den Haupt- Dampf- u. Segel-Schiffs-Coursen, sowie mit den grosseren Eisenbahnen und den unterseeischen Telegraphen, vorzüglich für die Handels-Geographie von America bearbeitet. Scale 1 : 11,112,500 or 152·2 geographical miles to an inch. 6 sheets. Chromolith. Maier, Stuttgart. Price 3*s.* (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Tiefenkarte des Caraïbischen Meeres. Scale 1 : 18,000,000 or 246·5 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881. Page 311. Justus Perthes, Gotha. (*Dulau.*)



MAP OF

HUDSON BAY

and part of

THE DOMINION OF CANADA

to accompany the paper by Robert Bell, M.D., F.G.S.
Assistant Director of the Geological Survey of Canada

Compiled from the latest Surveys

SCALE OF ENGLISH STATUTE MILES

The heights are expressed in feet above the Sea level, thus: 598
The soundings are expressed in fathoms (of 6 feet) thus: 173

Distances.

From Fort York (Hudson Bay) to Liverpool, 2966 Geogr. Miles
From New York to Liverpool, via Tory Island, 2987 " "
From New York to Liverpool, via Cape Clear, 3029 " "

Abbreviations

B	*Bay*	Hd	*Head*	Lr	*Lower*
C.	*Cape*	Hr	*Harbour*	Pt	*Point*
Cr	*Creek*	Ho	*House*	R	*River*
Fd	*Fiord*	Is	*Islands*	Str	*Strait*
Ft	*Fort*	L.	*Lake*	Upr	*Upper*

Published for the Proceedings of the Royal Geographical Society, 1881.

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

Exploration of the Rufiji River under the orders of the Sultan of Zanzibar.

By William Beardall.

Map, p. 704.

Having been commissioned by H.H. Seyyid Burghash to collect information of the country and people in the neighbourhood of the Rufiji river and its southern tributary, the Uranga, I left Zanzibar for the purpose on December 2nd, 1880. The expedition was furnished with two boats, the one a sailing cutter pulling eight oars, the other a four-oared gig, the former carrying ten, and the latter five men; making a total of fifteen men, all armed with Snider carbines. A large dhow conveyed the expedition from Zanzibar to the mouth of the Rufiji.

Dec. 8th.—We entered the Simba Uranga mouth of the river with wind and tide in our favour. After going about 9½ miles we missed the channel, and ran the dhow on to a mud-bank where—the tide presently falling—we were in due time left high and dry, nor did we get afloat again until 8.15 p.m., when, after sailing half a mile by moonlight, we anchored for the night. We were off by daybreak, the cutter towing the dhow. We soon had the tide with us. About 9.30 we reached the village of Kisimiti. Up to this place we had been sailing through avenues of mangrove trees growing in mud swamps, occasionally passing one or two small huts built on piles, the inhabitants of which were beginning to get in their second crop of rice. Beyond Kisimiti the mangroves gave place to forest trees and reeds. A breeze springing up, we were able to set sail. The banks became higher and the soil more sandy. We saw mango and banana trees, with occasionally one or two coco-nut palms in the villages we passed. The country appeared to be a flat, open plain. About 1 p.m., when we had reached about 25 miles up the river, the dhow ran aground again, causing further delay, so I decided to leave her here and go forward next morning in the boats.

Next morning we got everything stowed into the boats, and by 8.30 A.M. we left the dhow. Our progress was very slow; we had a strong current against us; the river was very shallow, and at most bends, where the deep channel crossed to the opposite bank, I had to have all hands out of the cutter to haul her into deeper water. By 4.30 P.M. we had made good about four miles only, and we then anchored for the night. We encountered similar difficulties next day owing to the shallowness of the river, and did not reach Mpembeno until 4 P.M. As this was a small place of about four huts only, we went on to Nya-n'tumbo's, a large village which we could see on the south bank of the river. Up to this point the river has been accurately surveyed by Captain Wharton and the officers of H.M.S. *Shearwater*, and here the great coast road from Kilwa to Dar-es-Salaam crosses the river. Mpembeno was formerly the crossing place, but it is now abandoned in consequence of an epidemic of small-pox which broke out there and carried off a number of the people; the ferry was then removed to Nya-n'tumbo's, a cluster of several small villages containing in all about seventy huts. Most of the slave caravans cross the river here, and from the number of good canoes (twenty-seven) which I saw drawn up on the bank, I expect the ferrymen drive a good trade. The people, who are Wagindo and Wamahoro, were suspicious, and the chief would not put in an appearance. I stayed here all the next day, and endeavoured to purchase a supply of food, but only succeeded in getting three days' rations of rice, and that at a high price. The people say they have had no rain for five months, everything is burnt up, and food very scarce and dear.

Dec. 12th.—The country in this part is a low-lying, flat plain, for the most part flooded during the wet season. Where not cultivated, the plain is covered with high, coarse grass and reeds; very few trees are seen. The soil, which appears to have been formed by alluvial deposits from the river, with a yellow clay subsoil, is very fertile, and grows splendid crops of rice, which is the principal grain cultivated.

The natives told us that the river was exceptionally low this year, as they had very little rain last wet season.

Dec. 13th.—We left Nya-n'tumbo's soon after sunrise on Monday morning, December 13th. The cutter was a heavy boat to pull against the current, and our progress was little more than one mile an hour. At one point there was so little depth of water that we had to land all the goods and stores and haul the empty boats for about 500 yards. We passed several villages, at one of which we halted for breakfast, and learnt that the people call themselves Wamamboka, but their language is the same as that spoken by the Wagindo and Wamatumbi. About 4 P.M. we reached Gunguno, a scattered village of forty or fifty huts, the river being about 300 yards wide. Here we anchored for the night.

Dec. 14th.—On starting in the morning we found the water again very shallow, and I had to have all hands as before out to haul the boats over. The number of crocodiles which we saw lying on the sandbanks made the men very timid about venturing into the water, and we lost a deal of time. Finally, we had to land everything out of the cutter, and whilst four men pulled the empty boat past the shallows, the rest of the crew carried the goods round by land for half a mile or more, and it was dark before they were up and we had the boat stowed again.

Dec. 15*th.*—We started the following morning about 7.50 A.M. The river here was about 300 yards wide, and quite deep enough for the boats. We passed several small Mamboka villages on either bank, and at 11.15 halted for breakfast at one called Kedi, the chief's name being Sura-Mkale, and the population about seventy in number. On starting again, at 3.20, we were able to set sail on the cutter and take the gig in tow. After sailing slowly for an hour and a half, only grounding once, we passed a broad channel, almost dry, coming in on the north side of the river. After passing this channel, the river narrowed to about 150 yards. The wind, too, freshened, and we went along merrily at about 4 knots an hour. By sunset we reached the small village of Nanandu. The river here is barely 100 yards wide. A clump of jungle, the first seen, comes down to the bank on the south side; on the north side were low reed-beds.

Dec. 16*th.*—Next day we started at 6.40 A.M. The river was fairly deep, but the current so strong that four men could hardly pull the cutter against it. At 9.30 we halted for breakfast. A breeze sprang up, and at 1.45 we started under sail, passing several small villages. The river here is little over 100 yards wide; the banks are about 9 feet high, the soil formed of alluvial deposits from the river, and the country open and flat. Presently we passed patches of jungle with mparamusi trees and branching palms on the south side, and then a bank or low cliff, some 40 feet high, of red earth, with jungle at the top, skirted the river on the south side. This was apparently a long, low spur of the Matumbi Hills. At 4.30 we reached a sharp bend where the river turned north by east, and the wind being then dead ahead, we could make no progress against the stream with the oars, so we were obliged to tow the boats from the banks, a task neither easy nor pleasant, as the river-side was lined with a thick growth of tall reeds. After towing for half a mile, we reached a few huts and anchored for the night.

Dec. 17*th.*—Our progress next day was very slow, alternately pulling and towing the boats; the river narrow and fairly deep, country flat and open. At 5 P.M. we anchored for the night at Malingwa, a long line of twelve connected villages, each under its own chief, the whole numbering about two hundred huts, on the north bank of the river. There were also more small villages on the south side of the river. Here the almost dry channel which we passed, near Kedi, leads out of the present river. The natives say that this was the old main channel of the Rufiji, but that three years ago the river burst for itself the present bed.

Dec. 18th.—On starting in the morning we found the river ahead much broader and consequently very shallow. I had all hands out of the boats, and with a deal of trouble we managed to haul them over the shallows for about 700 yards; then after pulling a short distance we came to more shallows, and again had all hands out of the boats. After passing these shallows, we were able to tow the boats for half a mile from the south bank; then crossing the river, we halted for breakfast. Here a high bank (about 50 feet) of red soil, with forest trees on the top, comes up to the river on the north side. There are villages on both sides of the stream. At 1.30 we started under sail, and ran on well for a quarter of an hour, when we reached a place where the river widened, with a long, low sandbank in the centre. Here we again got into shallow water, and had to have all hands out and haul the boats for about 500 yards; then we sailed on, passing a line of scattered villages on the south bank, the natives of which were shouting and using threatening language to induce us to stop. I was disinclined to lose the afternoon breeze, but on reaching the top end of the villages we came to more shallows and ran aground, whereupon the chief came off in a canoe. After some "talk," as he said they had some rice to sell and our stock was getting low, I decided to stay. The place is called Makogi, and contains over one hundred inhabitants, all Wamamboka; the chief's name is Ngrega-watu.

Dec. 19th.—My crew were grumbling for a rest, and next day being Sunday I gave them a holiday and bought them a sheep.

Dec. 20th.—On leaving Makogi we had all hands in the water hauling the cutter over the shallows for some distance, then alternately pulling and towing the boat from the bank. We passed the large villages of Nyampara and Matimbwa, containing perhaps 200 huts, and about 11 o'clock reached the village of Ndungunu, where we found two Swahili merchants settled, Hassan bin Omari and Chakua bin Mwalimu. They were trading in copal and rubber, and had also a good stock of rice, which they had bought up after the harvest at the rate of 36 to 48 *pishi* to the dollar, and were now retailing at eight pishi to the dollar; finding a rapid sale at that price, for few people in the country had any food at all. I bought 60 pishi of rice to replenish our own stock. Starting again in the afternoon, about sunset we reached the village of Mgweri-mkale and anchored for the night.

Dec. 21st.—During the next few days nothing of much moment occurred. We proceeded slowly up the river, which was from 200 to 400 yards wide; our progress was often hindered by sandbanks and shallows, over which we had to drag the boats. We passed numerous small villages of Wasoma, Wamlanji, and other tribes. The country on the south side of the river is a low alluvial plain, under water during the rains, whilst on the north there is generally a perpendicular bank from 20 to 50 feet high; in many places this bank has been undermined by the stream during flood, and numerous large trees have been washed down into the river, where they considerably obstruct the channel. On December 24th we sighted Mpanga and Behobeho hills, with the Ulugulu Mountains in the distance, and on December 28th we reached the village of the chief Korogero, where we met Mzee Sabaa, the Arab who brought the Sultan's boat up as far as here last year, and who is now trading in this part of the country, having married Korogero's daughter. Korogero is considered the head chief on the river, but since his town was burnt by the Wamahengi (Mahenge), most of his people being killed or scattered and he himself taken prisoner, he has very little power, and in fact only lives here on sufferance from the Wamahengi, to whom he pays a sort of yearly tribute, part of which he collects from neighbouring small chiefs. The Mahengi people seem to look on this part of the country as a sort of slave preserve. They are too clever to depopulate the country by one big sweep, but make periodical raids, burning one or two villages and carrying off a few slaves; in consequence, many of these Rufiji people, when they have got in their crops, hide themselves and their grain in the low reedy islands, of which there are many in this part of the river. Here they are not so easily surprised, as the Wamahengi are afraid of the crocodiles, which are very numerous in these swampy retreats. The country around on both sides of the river is a low, open plain, which on the north side stretches to within six or eight miles of the Mgeta river.

I met near here the chief of Behobeho, who told me that his villages had been burnt by the Wamahengi some months previously, and that he and those of his people who had escaped were now living near the river, Behobeho being quite deserted.

I met coastmen from Dar-es-Salaam, Kisiju, and Kilwa at Korogero, this being the meeting-place of the trade routes from Dar-es-Salaam, Mbwa-maji and Kisiju, to Mahengi, and from Kilwa to Ugogo and Unyamwezi. From Dar-es-Salaam the route is the one followed by Mr. Keith Johnston, the routes from Kisiju, Mbwa-maji, &c., joining it near Mkamba; there are two routes hence to Mahengi, one being that taken by Mr. Thomson through Behobeho and Zungomero, the other more to the southward leaving Behobeho on the north. This route is much the shorter of the two, but lies through totally uninhabited country, and except during the dry season caravans have considerable difficulty in crossing the Ruaha river; it is said to be a ten days' march from Korogero's to the first of the Mahengi villages. The Kilwa man told me that he had come up from there empty handed in six days of hard marching, sleeping at Punga Mkera (10 hours' march), Kitchi (10 hours), Mjimbwe (8 hours), Kiporoporo (8 hours), Bovu (10 hours) [Bovu is near the river lower down], Korogero (5 hours). From Korogero caravans to

Unyamwezi proceed to Zungomero, where they strike the old Kalingawana route.

The country along the lower part of the Rufiji, from the coast up to the neighbourhood of the first falls, presents few or no striking features. All the region on the south side of the river—except at one point between Kadi and Malingwa, where a low wave of higher land, with red top soil and covered with jungle, apparently a spur of the Matumbi Hills, comes up to the river—is a low flat plain, for the most part flooded during the rains. This plain is open, having few trees, and where not cultivated is covered with a rank growth of reeds, coarse grass, and some small bushes. The surface appears to have been formed by alluvial deposits from the river, on a subsoil of yellowish clay; the soil being very fertile, and growing splendid crops of rice, which is the chief product. The natives also cultivate maize, tobacco, pumpkins, sugar-cane, and a little cassava and sweet potatoes where the soil is light. Cotton would, I believe, grow exceedingly well here. I saw a few cotton trees in some of the villages, and they looked particularly healthy. On the north side of the Rufiji, from Mgweri-mkale's village to Mroka's the country is higher and well above flood-level, being about 50 feet above the ordinary height of the river; here the top soil is of red earth, and the country is covered with forest and patches of thick jungle. The principal crops grown on this red soil are millet, cassava, two or three varieties of beans and pulse, and sweet potatoes. The rest of the country on the north side of the river is a flat alluvial plain, similar in all respects to the south side.

The river itself varies in breadth from 100 yards to about a quarter of a mile; the average rate of current being three miles an hour. I do not think that it will be of much use for navigation, except by native canoes, and possibly small flat-bottomed boats drawing not more than two feet of water when loaded, for in the wider reaches the water is very shallow and the stream much obstructed by shifting sandbanks and other obstacles. The country close to the river is well inhabited for this part of Africa, both banks being fairly lined with small straggling villages. Away from the river extends a tract of very sparsely inhabited country dividing these Rufiji people from the hill tribes, i. e. the Wamatumbi and Wakitchi on the south, and the Wandendereko and Wazaramo on the north of the river. The Rufiji villages are all very much alike; generally a clump of mango trees, and a few bananas, and sometimes one or two coco-palms, in the midst of which is a number of small scattered huts, thatched with palmetto leaves, the sides of the huts being merely grass screens; a hut with plastered walls is rarely seen, the reason appearing to be that during the rains the country is under water. The people then go about in canoes, sleep on high bedsteads built in the roof of the hut, and do their cooking on a small platform of sticks thickly plastered over with clay, and raised on stakes above flood-level.

The natives all call themselves Warufiji, but they are divided into a number of small sub-tribes, the principal of which are the Wamamboka, the Wasoma, the Wamlanji, the Wamahoka, and the Wahimba. They appear to have no distinctive tribal marks or customs; most of them wear coast dress and ornaments, and profess to be Mahommedans, but they have no mosques and I never saw one of them performing any devotions. They still follow their old customs, such as burning for witchcraft, trial by ordeal, &c. They have three trials by ordeal: by one a bead about the size of a pea, to which is attached a "handle" of stiff fibre two inches long, is thrust up under the eyelid of the accused; the medicine man then makes a long speech, and if by the completion of this speech the accused has not been able to screw the bead from under his eyelid by winking and such like muscular contortions of his face, he is then pronounced guilty. By the second, they touch the tongue of the accused with a decoction made from the bark of some tree; if this stuff blisters his tongue the man is guilty. By the third, billets of dry wood are placed about a foot apart, grass and twigs are placed between, set on fire, and all fanned to a red heat; over this the accused—first having had his feet well washed—has to walk treading on each billet in succession; if his feet blister he is guilty. Twins are accounted unlucky, and killed directly after birth. Each little village has its own chief, who appears to be perfectly independent, and they have very little cohesion or centralisation. The chief has very little authority even amongst the people of his own village. When a chief dies his eldest son takes his father's name and dignities.

Near the coast the people speak Kingindo, with a mixture of Kimlima and Zaramo words. As we got higher up the river, I noticed more and more Zaramo words, until at Korogero's the people speak almost pure Zaramo; but most of the people understand Kisuahili. They have a deal of intercourse with the coast, through Kilwa and other coastmen, who come to buy rice, &c. No copal or indiarubber is found near the river, but much is brought down by the Wazaramo, Wakitchi, and other tribes, from the hills on either side of the river; on the river, it is exchanged for rice or cloth.

Dec. 30th.—After resting a day at Korogero's, on Wednesday, December 30th, I started with four men on foot to examine the Pangani Falls, which were within 20 miles of us, for, having heard such unfavourable reports of the river and country ahead, I decided to see the falls before I took the boats any farther.

After marching for about nine miles through grass and reed-beds principally, and keeping near the river, we reached the village of Soti—people Wakhutu—built on a sandbank in the river, which is here over a quarter of a mile wide. We waded across to the island, but on leaving we had to be ferried over to the south side of the river, as the water was deeper. Walking along near the south bank we soon came to higher ground, and after an hour's walk reached the village of Kigumi, situated in a patch of thick jungle, and well stockaded. It is a large village of nearly 200 huts, the people being Wagangi with a mixture of Rufiji and Gindo people who have sought protection there. On our arrival the chief sent me a present, but did not make his appearance. Next day, after a good deal of delay and persuasion, he came out, explaining that neither he nor his fathers had ever seen a white man, so he felt afraid. The result of all this was that I had to stay until the next day in order to get a guide; heavy rain fell during the afternoon and night.

Jan. 1*st*, 1881.—We had some trouble with the guides in the morning, and it was late when we got off, so we did not reach the falls until the following day. The country passed through was very rough, bare ridges rising in terraces of broken rock, with steep rocky spurs finishing abruptly at the river. We heard the roar of the waters as we neared the falls, and descended into a narrow rocky gorge with a high steep ridge on the opposite side; still we could not see the river until after clambering down amongst the loose rocks; we were then able to peep over, and saw the stream some 40 feet below, rushing at a great pace through a channel some 15 yards wide, which it has worn for itself in the solid rock. Masses of rock had fallen into this channel in several places, making small waterfalls.

After spending three hours at the falls we started on our return journey, and reached Korogero's on Tuesday morning, January 4th. Everything had gone on well during my absence; food, however, now became a serious matter, for the country was in a state of famine, and I could only just buy, at very high prices, enough food to keep my small party from day to day. A few days' delay at this place would probably exhaust the small reserve stock of rice which I was keeping to enable us to pass the uninhabited country ahead. I had also to consider the fact that the famine would be worse and food still scarcer at the time I should want to return. I sent men round the villages within reachable distance to buy all the food they could get, which was not very much, and made a start up the river, hoping to get the boats as far as the foot of the falls, for the hilly nature of the country obliged me to abandon all idea of taking the boats round this obstacle. But after going about two miles, we quite came to a standstill, and could get the boats no farther. The river on escaping from the hills spreads out to a width of nearly half a mile, and is full of banks and reedy islands, with the water nowhere more than a foot in depth, so I had reluctantly to turn back. In the evening I had the men up and told them that as we could get the boats no farther I should proceed on foot, and they would all have to carry loads; this the majority of the men refused firmly to do. My own three Dar-es-Salaam men were of course ready to go anywhere with me. Three of the others were sick and could not have marched; three others were unsound and would probably have broken down, and altogether I foresaw so much trouble and delay if I kept them, that I decided to send the whole back to Zanzibar in the gig, as they seemed determined not to proceed except by sheer force, which would mean delays and want of food. Six men stayed with me out of the fifteen; one, the coxswain, I left in charge of the boat. I then had to engage nine natives as porters; being planting season I had some difficulty in getting men, and none would engage for a long journey. I eventually succeeded in getting nine men and a boy, who were to accompany me at all events as far as some second falls which I had heard of.

We packed the goods and stores into the smallest compass we could, and on Monday, January 10th, about noon, we made a start; in two marches reaching Kigumi's, where we were detained a day trying to buy food. The people here told me that the hills to the south, near Lohembero Peak, are very rich in copal and rubber. It is Idonde country, but most of the original inhabitants have been driven out or killed by the Wamahengi and Wagwangwara.

Jan. 13th.—On Thursday morning we started across the hills; our afternoon march was stopped by a very heavy thunderstorm, which obliged us to take shelter under the huge overhanging rocks; and the rain continuing we had to stay the night there. Starting next morning uphill, we walked on a long ridge, then turned down to the river which we struck at Mkalingo, a village consisting of half-a-dozen small grass huts, and situated about a mile above the falls. The river is still unnavigable here; we walked along it for a mile, and then halted for breakfast at Maruka's, whose village is on a small reedy island, but there were, however, three grass huts on the main bank where we got shelter.

The Pangani Falls are formed by a range of hills running nearly north and south. Mpangwa, Behobeho, and Kipulala are the highest peaks; to the southward a low ridge extended as far as the eye could reach; to the northward, the range appeared to run in a broken line through Behobeho to the Ulugulu Mountains, and to form the watershed of the Ruaha to the eastward. These hills are apparently the edge of a higher plateau; on their eastward side they rise in steep rocky terraces, whilst to the westward their slope is very slight and gradual, and all the country high and undulating; the geological formation is similar to that of Behobeho, described by Mr. Thomson. Through a narrow winding and rocky gorge in these hills the river runs, the fall to the plain below being considerable, but as I had with me no aneroid or boiling-point thermometer, I was unable to get any heights.

Leaving Maruka's village about 3 P.M., we marched over undulating open forest country, the trees principally mimosas, the soil light with much broken quartz and stone, and the land drained by rocky nullahs.

We passed the junction of the river Ruaha. During the dry season the Ruaha brings down less water than the Uranga, and is very shallow; but I am told that during the wet season most water comes down the Ruaha.

The following day at noon we reached the village of Simba-Mbili, on an island; the river up to this point runs through and over a narrow bed of broken rock in a succession of rapids and falls, the channel in some places being little more than 20 yards wide. The country round about and the river scenery reminded me very much of the Rovuma above Mayeye.

Simba-Mbili village has about twenty-five huts; the people, who are Mawanda, had no food to sell us; they themselves were living on fish and a white tuber about the size of a potato; this they dig up in the forest. In its raw state it is poisonous, and requires to be cut into thin slices and soaked in the river for a day, and afterwards thoroughly dried in the sun, pounded and boiled, or made into flour before it is eatable. They say the beer made from it is very good and strong.

All the people on the river make great use of poisoned weapons; lower down they spear the hippopotami on shore on moonlight nights with poisoned assegais. Here, besides poisoning their arrows and lances, they use poisoned bullets; the poison, which greatly resembles pitch, is plastered all over the ball, which is several sizes smaller than the bore of the gun. Any animal receiving a slight flesh wound from one of these balls is certain to be found dead next day. The poison is obtained from the bark of a tree, boiled down.

We were delayed next day through one of the Rufiji porters being sick.

Jan. 17th.—I got two men as guides from Simba-Mbili, and we left his village on Monday morning, January 17th; on measuring our stock of rice and millet, we found that there remained just two and a half full days' rations per man, so, as we had several days' march through uninhabited country before us, I at once put every one on half allowance, i.e. half a pound of rice a day per man, and it was well that I did so, for we got no more food for eight days; but as we managed to shoot several antelopes, and always had meat in plenty, we did not suffer from hunger.

Our route lay along the south bank of the river, through very rough rocky country; there was no path, except where elephant or hippopotamus tracks led in the right direction. The ground in many parts was almost paved with broken rock, and most of the trees were thorny mimosas. These marches tried the men very much, walking with bare feet; most of them got lamed by the sharp stones and thorns, after they had made themselves sandals of waterbuck hide they got along better. We had rain too every day, which hindered us, for when a heavy storm came on we had to halt and shelter the goods; there were generally plenty of palmettos growing near, so we were able to construct a fairly water-tight hut in a very short time.

Jan. 22nd.—On the morning of January 22nd we reached the Shughuli Falls. Where we first saw them the river, about 20 yards wide, rushes in a succession of falls and rapids between high rocks; on the south side the rocks rise almost perpendicularly to a height of some 50 feet; on the north side the rocks are more sloping, and in several places run out into the stream, leaving only a space of eight or ten yards, through which the water rushes foaming. A few families of Wagangi who live on a small island of rock just above the falls, seemed to get their living principally by sitting here waiting for the fish which are carried down the falls and thrown up into the pot-holes in the rocks. My men found one large fish about three feet long. Half a mile farther we reached the junction of the Luwego and Uranga. Up to this point the river is called the Rufiji.

The Luwego, a large stream, here 100 yards wide, comes in from the south and south-west, and the Uranga comes down from the north-west; the delta formed by the junction of the two rivers is a sort of low rocky valley of granitic formation; most of the rocks are tilted towards the north-east at an angle of nearly 45 degrees, as though by pressure from below. Where sand has collected between the rocks trees have taken root, forming a sort of jungle on the small islands, amongst which the Uranga river runs in three larger and innumerable smaller channels, all forming a succession of little cascades. I noticed in this delta many "miwali" palms, from the leaves of which the Madagascar grass-cloth is made, and other trees growing on stilted roots like mangroves; a solitary oil-palm stands at the head of the falls.

Four families of Wagangi were living on a rock in the delta. They had two bark canoes, but they refused to ferry us across the Luwego until they had communicated with a bigger chief called Mlongora. They, however, consented to take some of my men across to bring back food, our rice being quite finished; but they would not start until the following day. The men took a supply of calico and returned the following day with some rice and millet, and an invitation from Mlongora to hurry on to his village. The next day was wasted in bargaining with the canoe owner, who wanted twenty cloths for ferrying us across; finally we had to give him one turban cloth, one piece of kaniki, and two doti of amerikani. They then carried the canoe half a mile up the Luwego to a better crossing place. Still there were falls above and below us; the stream was running like a mill race, whilst the waves caused by the water breaking against the sunken rocks made the little bark canoe fairly dance; but the canoe men were very dexterous, and we all reached the other side without mishap by 12.45, and set off at once, but did not reach Mlongora's village until 5 P.M., as we got lost and wandered close to the foot of the Mberara Hills before we discovered our mistake.

Mlongora's is a village of over sixty small gabled huts thatched with palmetto leaves, the better huts plastered, a space being left open at one end for baraza. The people are Mawanda and Gangi, with some Gindo and Donde slaves. They are on good terms with one or more of the Mahengi chiefs. This by no means grants them immunity from an attack by any other chief of that marauding tribe, and they live in constant dread, though they themselves are in the habit of putting on Maviti costume and harrying their weaker neighbours. The women and young men wear a small piece of calico passed between the legs, and held up before and behind by a belt of bead rope. No iron or salt is found in the country, and they are dependent for these necessary articles on passing coast caravans. They all use rudely shaped wooden hoes made of blackwood—coast ebony; I saw three sorts, one shaped like a spud for digging, one shovel-shaped for weeding, and the other like a small double-bladed paddle, one blade being cut off square for weeding. They seemed fairly effective, but required often sharpening. One small native adze of iron appeared to be the public property of the village, and every morning at sunrise I saw the women taking turns at sharpening the hoes before commencing work.

The village is on an island about half a mile long; flat, with good soil. At the lower end of this island a bar of rocks extends across the river and forms the head of these falls. Below here the river runs in innumerable little channels and waterfalls amongst the rocks until it joins the Luwego at Shughuli. At Mlongora's the river flows from the south-west; lower down it is turned by the high ridge, and on joining the Luwego it flows from the north-west. Two small villages of Wagangi, Mkwawi and Momboli, are built on the rocks in this delta for safety. Above Mlongora's there are two other villages on islands in the Uranga; Legoa's about three miles higher up, and Luganako's, about as far again. The people are Wagangi. Beyond this are no more villages until the Mahengi country is reached, which is two long days' march ahead.

About a mile above Mlongora's the Uranga, which up to this point comes down from the north-west, is turned by the Mberara Mountains, which rise from the river in steep jungle-clothed peaks, and to the height of nearly 2000 feet above the plateau on which they stand. The Uranga river above Mlongora's was deep, with a very slow current. Canoes from Mahengi come down as far as here. The natives tell me that there are many islands in the river, and that at one place above here it is difficult to get a canoe past, owing to the rocks in the stream.

Mlongora received me well and gave me a fine fat sheep, but we found food very scarce and dear, and I had to make the chief a big present before he would allow his people to sell me anything.

The country between the Uranga and Luwego rivers is called Ugangi, or Upogoro, the two words being used indifferently for both the country and the people, the only explanation I could get for this being that the old Wagangi had died out, and the present inhabitants were Wapogoro. Most of the Gangi country is now under the rule of an Ubena chief called Mtengere (the name mentioned on Captain Elton's map), but he has shifted his position since then, and is now settled on the south side of the Uranga river, in the Gangi country, and at the back of the Lohembero Mountains. He has conquered the Wagangi, and they now are living under him. From the hills near Shughuli I sighted these Lohembero Mountains, a lofty distant range bearing W.S.W.

Caravans from Kilwa continually visit Mtengere's town to buy slaves and ivory; some pass through here. From this point they either follow the Uranga round by Mahengi, which makes about an eight days' journey, or go by a shorter, but very rugged road through the Wagangi and Lohembero hills, and arrive on the fifth day; and there is yet another route from Kilwa which crosses the Luwego higher up, two days' journey from here, at its junction with a large stream called the Mbalanandu, which flows into the Luwego from the southward, then onward over the Wagangi and Lohembero mountains; they first strike the Uranga at Mtengere's, where the river is said to be wide and deep, with no current. There is said to be a trade route from Mtengere's to Tanganyika through Usango. I could hear nothing of a road to the north end of Lake Nyassa, but heard from a Kilwa man of a route leading from Mtengere's through the Magwangwara country, which reaches the lake near Losewa.

A caravan of Kilwa men in charge of a half-bred Arab crossed the Luwego the same day as we did; they crossed at Simba's, a short distance higher up the river, and stayed at Legoa's village on the Uranga. They were on their way to Mahengi to buy ivory, or failing that, india-rubber, which the Mahengi people now collect in great quantities. A party of these Kilwa men came to Mlongora's, which was the only place where they could get food; they were highly indignant at the high prices which Mlongora demanded, and informed my men that had I not been there they would have burned down the village and taken what they required.

They told me that they had suffered very much from want of food on the road up, but hoped for better times at Mahengi, which is looked on as the land of plenty in these parts; they had come up from Kilwa in thirteen days, not including stoppages, and gave me the following list of marches:—

Days.			Hours.	
0. Kilwa Kivinga.				
1. Mitola's village	..	Mandandu tribe ..	4	
2. Kitoi's "	..	Mkumbaji " ..	4	
3. Bwana Hassan's village,		Yao " ..	4	(here cross river Mtumbei).
4. Mpinda's	"	" " ..	3½	

Days.			Hours.	
5.	Kitelikega's village	Gindo tribe	11	(including midday halt).
6.	Ndengo	forest	9	,, ,,
7.	Mpoma's village	Kikiraji tribe	11	,, ,,
8.	Mkwenya's ,,	Donde ,,	10	,, ,,
9.	Kinyenyena's ,,	Mitowa ,,	10	,, ,,
10.	Mgogi's ,,	Gangi ,,	7	
11.	Matalomi	forest	5	
12.	Simba's village	Gangi tribe	10	(here cross river Luwego).
13.	Legoa's ,,	,, ,,	3	(on island in Uranga river).

The greater part of the Rufiji river between Pangani Falls and Shughuli is totally unnavigable. From Pangani up to the first villages of Simba-Mbili the river runs in a succession of rapids and low falls, through a narrow rocky channel. From Simba-Mbili's to the junction of a small river called Lutope, which joins the Rufiji on the right bank, the stream is obstructed by numerous ledges of rock, which extend across the river, forming natural weirs. Above here the river widens out, in some places being 500 yards wide, very shallow, and full of bare sandbanks, and a few reedy islands and ledges of rock; but here, after the rains, when there is plenty of water in the river, it might be possible to get a light gig up. The average rate of current at this place is two and a half miles an hour. As we near Shughuli the river narrows again, and the stream is barred again by ledges of rock and low falls. The natives tell me that at no time of the year is it possible to go all the way from Simba-Mbili's to the foot of Shughuli Falls in a canoe.

The country between Pangani and Shughuli is hilly and rugged, and the falls of the river narrow. From Maruka's to eight or ten miles beyond Simba-Mbili's, are broad ridges of open forest country sloping easily down to the river, but beyond this the hills rise abruptly, in well-defined rocky terraces, from the river, generally in three terraces; the ground in many parts is almost paved with broken stone. The tops of the highest ridges are flat, covered with forest of very thin timber, principally "miombo"—the tree from which the natives make bark cloth. The soil is generally of red earth, with a yellowish sandstone under it. The lower strata of rock I took to be gneiss; it closely resembled granite, and was of two sorts, one grey, the other of a reddish colour. I noticed, too, plenty of broken quartz, and beds of a greenish stone cropped up in some places; it generally appeared to have got tilted up on edge and then cracked into squares until it somewhat resembled a Mount-Sorrel pavement. On the lower ground the country was open, growing only a few stunted thorny trees. Several places were pointed out to me by the guides where there had been villages before the Wamahengi overran the country; but the land is too barren and rocky ever to have been able to maintain a large population; on the north side of the river, up to the Ruaha, the country is totally uninhabited; to the south-east, at a considerable distance from the river, are a few small scattered villages of Wandonde and Wapogoro. The whole country from above Shughuli to the plain below Mpange Hills is infested by the tsetse-fly.

I wanted to go forward as far as Mtengere's town, but it would have been necessary to pass through Mahengi, where I should in all probability have been delayed; my Rufiji men, moreover, were anxious to get home to their young crops and would go no farther, and I could get neither guides nor porters from Mlongora, who told me that only last month the Magwangwara—or "Wamachota," as they are generally called here—had got round to the southward of Mtengere's and swept the Ugangi country between here and his (Mtengere's) town, and that the people who had escaped were living in the jungle and amongst the rocks, and there was no food. The result was said to be a war between the Magwangwara and Wabena, but no definite news of this had arrived. The rainy season too appeared to be commencing somewhat early, and the Kilwa men told me that after a month's time the streams would be in flood and impassable, so I reluctantly decided to turn back.

We had been assured by Simba-Mbili that at Shughuli we should find grain so cheap that "they would not stop to measure it." On the contrary, we had very great difficulty in obtaining a sufficient supply to enable us to return to the boat; fowls or eggs we could not get, and had to trust to our rifles for meat, of which happily we did not run very short. The grain we got was exorbitantly dear.

Jan. 31st.—We finally left Mlongora's on Monday morning, January 31st. On reaching the Luwego a fresh imposition awaited us in the shape of fresh payment at the ferry, there being a different canoe and different men. The general rule is that returning caravans who have paid on their way up are ferried on their return free of charge, but our old friend had hidden both himself and his canoe; however, by a little judicious bullying we managed to get ferried over without much delay for one and a half doti of amerikani; and that night we got as far as our old camp at Mkwali river.

Feb. 4th.—Four more toilsome marches took us to Simba-Mbili, who we found had shifted to his second village lower down the river; this removal caused me the loss of some antelope skulls which I had left in his charge; he had left them at the other village, and I had no time to send back for them.

Feb. 6th.—We reached Msisima's village below the Pangani Falls in two marches. I sent the Rufiji porters home from this place in charge of Quena bin Ali, and decided to remain a day or two, partly to climb Mpanga Hill, and partly in the hope of getting some shooting. Kigumi sent me a fowl, some eggs, and a basket of millet.

It rained almost incessantly for the next three days. On the fourth I crossed the river and had ascended some distance up Mpanga Hill, when it became cloudy, so that I could get no bearings of the coast hills; the climbing was very toilsome, owing to two boils on one of my ankles. Afterwards we saw some fresh buffalo tracks, but the animals had taken refuge in a jungle so thick that we could only follow them by keeping in the path which they had made. We tracked them for over three hours, several times being within ten yards, the first intimation we had of their close proximity being the grand crash as they broke away. We finally forced them out of the cover, but they would not stand in the open, they galloped round in a long curve and took refuge in the jungle again; so we left them there.

Feb. 11*th.*—The following morning I hired a canoe and was paddled down to Korogero's in about six hours. I found the cutter and the stores which I had left here quite safe. The man to whom I had confided the charge of the boat was very pleased to see me; he had eaten up all the food I had left him, and was then living on roots and the heart of a kind of palmetto—native name *milala*—which tastes much like the heart of the coco-palm.

I remained two days at Korogero's to pay off my porters, arrange and repack stores, and put the boat in order. We were only able to buy one day's rations of millet, owing to the famine; people were dying of starvation, and it would be more than six weeks before their first crop of maize would be eatable. I had fortunately left nearly a whole bag of rice in Korogero's charge, and this we found intact. Natives who had any cloth or money were going to Zungomero to buy food.

Feb. 14*th.*—We left Korogero's on Monday morning, February 14th, the river was about two feet higher than when we came up, and the boat seldom grounded.

Feb. 17*th.*—On Thursday morning about 11 A.M. we reached Nya-n'tumbo's close to Mpembeno, and managed to buy two days' rations of rice. All we had been able to purchase in coming down the river was five heads of maize and three fowls; many natives had come with dollars to try and buy rice from us.

Nya-n'tumbo came to see me in the boat, and on my questioning him, he swore most solemnly that no slaves ever crossed the river here. He had not done speaking when one of my men, who had been ashore, came down to the boat and informed me that he had just seen a caravan of about fifty slaves at the back of the village. They were waiting to cross on their way north; the owner had run away and hidden himself when he heard my boat was there.

The next day, February 18th, we reached the mangroves and salt water, and on the 19th arrived at the Kikunyia mouth. We touched at Koma Island and Dar-es-Salaam on our passage to Zanzibar, where we arrived at 11 P.M. on the 26th.

On the Construction of Isochronic Passage-Charts.

By Francis Galton, F.R.S.*

Map, p. 704.

By "isochronic" passage-charts, I mean charts constructed to show the extreme distances that can be traversed in "equal times" from a common starting-point. Their principle is an extension of that by which the rise and fall of temperature as we proceed in different directions is shown by means of isothermic lines, or again as that of barometric pressure is shown by the isobaric lines which may be seen in the small weather chart published daily in the *Times.*

In the accompanying map the starting-point is London, and the travellers are supposed to use postal or other rapid or regular conveyances so far as they help, and thence to employ such private means of conveyance as the country may afford. I assume the seasons to be favourable, that immunity has been obtained from political obstructions, and that friends on the spot have made preparations to avoid delay in engaging travelling servants, beasts of burden, or boats. I have kept the idea in view of a special correspondent calculating how long it would take for his letters to reach his employers, under the best arrangements he could make without an extravagant cost. The sea isochrones are for the most part drawn through the points reached by the various passenger steamers in the corresponding number of days. In the Arctic regions the estimates are necessarily rude; they have been based on recent voyages. All places within ten days' journey of London are coloured green, those between ten and twenty are orange, between twenty and thirty they are red, between thirty and forty they are blue, and those beyond forty are brown.

The data upon which the map is based are (1) the time-tables of the principal ocean steam-packet companies. (2) A list which has lately appeared in the Postal Guide of the average time taken by the post to reach various places. (3) Private information furnished to me by friends, including some officials at the General Post Office. (4) Records of voyages. By these means I obtained data for a considerable number of important ports and other places distributed over the globe, and I procured as I best could the particulars concerning the chief local lines by sea and land proceeding from those places. In this way the skeleton of the chart was formed, which I filled up by means of measurements based on the average length of a day's journey in the country under consideration. I think there is no estimate in the chart that does not admit of defence, but I freely acknowledge that judgments may greatly differ in many cases as to whether a different estimate might not have been preferable. A common subject of doubt is whether to adopt the time occupied by the regular and roundabout communication, or that by an occasional direct one. Instances of this are found all along the West Coast of Africa, where the ports are regularly served by steamers that touch at every one of them in succession, and which consequently occupy more than forty days to reach even the mouth of the Congo, whereas steamers occasionally sail direct to one or other of those ports in considerably shorter time than these mail steamers. This particular difficulty is met and explained by the sea isochrones, which in this case do not conform to those of the land. It will be seen that the sea adjacent to the greater part of West Africa lies within the yellow band, and therefore that a ship going direct to any point within that band and steaming at the same rate as the mail steamer to the Cape, Pará, or St. Thomas, would arrive at its destination in from ten to twenty days.

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* Read at the Geographical Section of the British Association, York Meeting, September 1st, 1881.

In a map on a larger scale than this, many more details could and ought to be given, including at least the great through routes by sea and land, but the present map is too small for the purpose. It is offered merely as generalisation with the primary object of illustrating a new principle, which perhaps may hereafter be developed in more elaborate publications. The principle could be adapted in many ways for the convenience of tourists; thus isochronic maps might be easily constructed for Continental travel or for home excursions.

GEOGRAPHICAL NOTES.

The Jeannette Expedition.—Public interest in the fate of the *Jeannette* is perceptibly increasing as the autumn wears away without any tidings being received of her whereabouts. Neither the revenue cutter *Corwin*, nor the *Rodgers*, has yet found any traces of the missing vessel, although the former is reported to have reached and landed on Wrangell Land. Still there is no ground for despairing of the safety of the crew, and perhaps of the vessel, as the expedition was provisioned for three years, and the search up to the date of the latest news had not reached very far. Professor Nordenskiöld has communicated to the *New York Herald* various items of news from the Siberian coast, which may, or may not, have reference to the missing expedition. One of them is to the effect that the commander of the *Lena* (the Professor's steam tender left by him in the river of the same name) had heard that a Yakut had seen a steamer at the mouth of the Lena on the 13th of September, 1879; and the other that the *Louise*, a trading steamer which has made the voyage this summer between the Yenisei and Norway, reported that some Samoiedes had found last winter (1880–1) near the mouth of the Yenisei the corpses of two Europeans and a bottle of whisky, a fact of some significance, as no European crew was known to have been lost there last year.

The Polar Ice-conditions in 1881.—The wonderful voyage made by Captain Adams in the well-known steam whaler, the *Arctic*, affords another proof, in addition to the easy run up Smith Sound and back by the *Proteus*, of the unusual freedom from ice this summer of the channels of Arctic America. Without charts, and with compasses useless in a region so near the magnetic pole, Captain Adams went up Wellington Channel as far as it has ever been navigated, along Barrow Strait, and down Peel Sound to within a few miles of where the *Erebus* and *Terror* were wrecked, afterwards proceeding up the Gulf of Boothia as far as Cape Nordenskiöld, and holding intercourse with Esquimaux near the entrance to Fury and Hecla Straits. To the east of Greenland a totally different condition of things has prevailed, and according to observations made by Captain David Gray, of Peterhead, the edge of the polar pack is some 6° nearer the shores of Europe this summer than it was in 1879. Captain Gray has favoured us with a short paper on the subject, illustrated by a chart, which will be published in our next number.

The Italian Antarctic Expedition.—In consequence of the inadequate response from the Italian Government and people to the appeal for funds to defray the expenses, the Central Committee of the Italian Antarctic Expedition, located at Genoa, have been obliged for the present to abandon their main object—the despatch of an expedition to explore the lands round the South Pole. In lieu of this Lieutenant Bove, the intended chief, has accepted, with the consent of the Genoese Committee, the command of an expedition, organised at his solicitation by the Argentine Government, for the scientific exploration of the coast-lands of Patagonia and Eastern Tierra del Fuego; and the funds of the committee will be devoted to fitting out and supporting a party of *savants* who are to accompany the expedition, but are to remain under the orders of the committee. Lieutenant Bove left Italy finally on his mission on the 6th of September; the rest of the expedition, consisting of Professor Lovisato (geologist and mineralogist), Dr. Venciguerra (zoologist, especially the marine fauna), and Lieutenant Roncagli (ethnographer and artist), sailed for the same destination on the 3rd of October. The Italian members have orders to pay especial attention to all inquiries that are likely to be of service to the hoped-for future expedition to the South Pole, and in order that they may profit by any opportunity that may offer of extending their resources southward in the direction of Graham Land, they are to be provided with a separate vessel, a whaler, chartered by Lieutenant Bove, and flying the Italian flag.—The scientific results of the Patagonian expedition are, by agreement, to be published in Italy, and in Italian, at the cost of the Genoese

Committee, and the collections made are to be equally divided between them and the Argentine Government. The Argentine gunboat *Uruguay* and the corvette *Cabo de Hornos* are mentioned as the vessels indicated for the service of the expedition.

Belgian African Expeditions.—Currency has been given in the London press to a report that four new expeditions were being organised in Belgium for simultaneous exploration on a grand scale in Central Africa. The names of the leaders were given, and their proposed routes described with some detail. We have authority from one of the supposed leaders for stating that there is no truth in the report, and that the whole story is pure invention.

Recent Explorations in the Rovuma District and News from Lake Nyassa.—Our young African traveller, Mr. Joseph Thomson, now engaged on account of the Sultan of Zanzibar in exploring the geology and mineralogy of his dominions, has completed the first part of his mission—the examination of the reported coal-fields on the Loende tributary of the Rovuma—and was back in Zanzibar on the 21st September. He has made an interesting journey, but found no coal. The route followed on landing in Mikindany Bay was along the northern side of the Rovuma, through the dense matted jungle which Livingstone described in his expedition of 1866. Immediately from the shores of the Indian Ocean the land rises to an altitude of 300 feet, and the jungle-path, rich in india-rubber trees, leads for eight marches into the interior, the plateau gently rising until it reaches an altitude of more than 2000 feet. At that point the road descends to the banks of the river and thence a long march across an uninhabited country leads to Ngomano, at the junction of the Loende or Lujende. Mr. Thomson ascended this river to a point two days' journey beyond Itule and past the locality where coal had been erroneously reported to crop out in cliffs on the river banks. Mr. Thomson's next trip will be to Mombasa.—From the Rev. R. M. Heanley, of the Universities' Mission, we learn that the Rev. Chauncy Maples had returned to Msasi from his long and important reconnoitring journey to the almost unknown region south of the Rovuma, towards the Luli and the head waters of the Loende. He had been absent two and a half months and travelled about 900 miles. His maps and a paper describing his journey will reach us in due course.—From Lake Nyassa Dr. Laws reports that Malisaka, the chief at the north end of the lake, is dead, and that a war had been raging between his successor and a rival, the latter having been driven away. He writes further that the Mangone or lake Zulus had again become troublesome, and were harrying their neighbours, that severe cold had been experienced (early in August) at Bandawe, about midway up the lake on the western side, in lat. 11° 55′ S., and that he had reduced to writing the Kitonga and Kinyanja languages.

M. de Brazza's Journey from the Ogowé to the Congo.—Some further details have been received, in a communication to the *Missions Catholiques* by the Roman Catholic missionaries in Western Africa, respecting M. de Brazza's journey from the Upper Ogowé to the Congo, to which we have before referred.* After leaving his station at Francheville in July 1880, the traveller saw the sources of the Passa affluent of the Upper Ogowé, and crossed the river Lekéti (an affluent of the Alima, the Kunia of Mr. Stanley's map), which appears to have been misnamed M'pama in the map of his previous journey, by this route reaching the navigable portion of the Alima in four days. It is thought probable that the plateau of the Batékés reaches to the right bank of the Upper Ogowé, and is connected with that of the Bayakas, in which, perhaps, the river Ngunié, which joins the Ogowé below Lambaréné, takes its rise. The plateau of the Batékés (Achicuyos) separates the Alima from the M'pama (the M'paka of Mr. Stanley), which probably rises in the plateau of the Balalis, flowing direct to the Congo. Leaving the plateau of the Batékés (Achicuyos) by the M'pama, M. de Brazza arrived at the plateau of the Abomas, which is well peopled and very fertile, and separates the M'pama from the Lefini (the river Lawson of Mr. Stanley). On leaving the plateau of the Abomas, M. de Brazza was assured that he could reach Stanley Pool, on the Congo, in four days by way of the plateau of the Makokos, but he thought it advisable to change his route, in order to enter into negotiations with the Ubangi tribe, with whom he had had previous difficulties. He afterwards descended the Lefini on a raft to within a day's journey of its confluence with the Congo. He then marched by land, with only five attendants, in two days to the Congo, which he reached near to a populous part of the Ubangi country. He was received by the chief Ngampéi, who is subject to the Makokos, and arranged with him to make certain propositions to the Ubangis. Without waiting for the result of this step, he returned to the Lefini, and in two days' time reached the plateau of Makoko, to whom all the country is subject between the Lefini, the Jué (Zué of Mr. Crudgington and Gordon Bennett of Mr. Stanley), and the Congo. Makoko assembled all the chiefs of the Ubangis from the Alima, the Bakinga (the Likuna or Likona of the old maps), and the Ikelemba, and through his influence peace was made with M. de Brazza. Makoko then sent two chiefs down with him by canoe to the spot ceded for the Brazzaville station near Stanley Pool. Whilst there, M. de Brazza explored the road from the village of N'gamforu, chief of the Abomas, to the river Kunia across the plateau of the Makokos; and he considers that the principal difficulties to be met with on the road from Francheville to Stanley Pool would be the passage of the rivers Lekéti, M'pama, and Lefini.

Recent News from the Congo.—In a letter addressed to *Les Missions Catholiques*, from Banana, dated July 11th, Père Carrie announces that the expedition under Père Augouard finally left Vivi for Stanley Pool on July 7th. Père Augouard originally left Landana for this purpose on April 7th, but he was then unable to obtain porters, and after spending two months in fruitless endeavours on the Lower Congo, he appealed to Père Carrie to engage them in the northern part of the Mission. This with characteristic energy he set to work to do, but it was only after considerable delay that he collected thirty-two men and boys. The expedition left Landana for Vivi on June 27th, and, as we have said, made their final start for the interior on July 7th. A little before this a Belgian engineer, with twenty-seven men, set out to join Mr. Stanley at Manyanga, and to accompany him at once to Stanley Pool. Père Augouard hopes to be able to join them, as it would probably not take more than eleven days to reach Manyanga, where Mr. Stanley, it seems, has already formed a station, which has been placed in charge of Lieutenant Harou.* It will, of course, be of material assistance to Père Augouard to be able to make his journey under these circumstances, as his men, encouraged by Mr. Stanley's large caravan, will probably make no difficulty about proceeding to Stanley Pool.—Père Carrie mentions in his letter that there is a report at Banana of the formation of two Belgian trading-companies for the Congo, and that the principal Dutch firm there contemplates immediately establishing an agency at Stanley Pool; also that M. Savorgnan de Brazza was expected to be there by the beginning of July.—After establishing themselves at Stanley Pool, the Roman Catholic missionaries announce their intention of pushing on further into the interior, and eventually occupying the magnificent valley of the Kassai.—The Rev. T. J. Comber has reported to the Baptist Missionary Society the formation of stations at Isangila and Mbu, on the north bank of the Congo, and he adds that he and his colleagues are only waiting for reinforcements to occupy Ibiu at Stanley Pool, his great anxiety being that the Jesuit expedition under Père Augouard may not be much beforehand with him in reaching the pool. Mr. Henry E. Crudgington, of whose rapid journey up the Congo we lately gave an account,† has visited England to make arrangements for this important enterprise, and was expected to reach the Congo on his return about the middle of October. It is probable that Mr. Dixon, who accompanies Mr. Crudgington, will be stationed at San Salvador for the present, so that Mr. Hartland may be able to join the north bank expedition, provided that arrangements can be made for the Mussuca depôt in the absence of Mr. Grenfell, who is coming to England to superintend the construction of a steam-launch for the exploration of the upper reaches of the Congo.—A boat of somewhat novel construction has lately been built in England for use by Mr. T. J. Comber on the Congo by Mr. Sydney Comber, who is about to become a medical missionary. The object being to make the boat both portable and durable, it has been constructed of canvas coated with a mixture of lampblack and tar. The canvas is stretched into shape by means of canes fixed into brass eyes on each side of the boat, which does not weigh more than 60 lbs., and can be easily taken to pieces and carried by two persons. It is also stated that by a little arrangement it can be converted into a tent.

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* See *ante*, pp. 182, 359, 484.

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* See vol. ii. p. 562.

† See *ante*, p. 553.

American Missionary Expedition to the Bihé Plateau.—The Rev. W. W. Bagster, as we have before recorded,* left London at the end of September 1880, for West Africa, in order to found a mission station for the American Board of Commissioners for Foreign Missions on the Bihé plateau. On November 13th he arrived at Benguela in company with Messrs. Sanders and Miller. After some stay there, they proceeded to Catumbéla, 12 miles north-east of Benguela, which place it has quite superseded as a business centre. The party started from Catumbéla on March 11th, and in fifteen days reached Bailundo, 200 miles from the coast and about 50 miles from Bihé. The road proved very narrow and difficult, and the annoyances are said to have been very great. While the days were hot, the nights were cool, and for a long distance there was but little appearance of tropical vegetation. Though passing for some days through grand scenery, the party saw nothing to cause special surprise to Americans, but on March 18th, having gone round Mount Longa, they began to ascend the mountains, and reached an elevation, which was afterwards maintained, where the air was perceptibly different and more refreshing; there the grasses were of great beauty, but owing possibly to the time of year the flowers were not abundant. The size of the rivers appears to have been somewhat exaggerated by previous travellers, as they are described as "merely good-sized brooks." Among the products of the country traversed, Mr. Sanders mentions beer, which is made by boiling meal, and adding to it, when cold, water prepared with the juice of a root. Corn-meal and corn in the ear constitute the staple food of the people, and after reaching Kibonda, sweet potatoes in abundance were met with, as well as a few beans. On account of great and unforeseen delay in the arrival at Bailundo of the stores which it had been arranged should follow them into the interior, it was determined that Mr. Bagster should return to the coast on April 12th, and on June 13th, the date of the latest advices received in Boston, U.S., he was still at Benguela. In the meantime Messrs. Sanders and Miller remained encamped at Bailundo, which is to be one of the future stations of their mission, and were engaged in acquiring the Ambunda language, used on the Bihé plateau, in which they had already made considerable progress.

Raverty's Notes on Afghanistan—Bolor or Bilaur.—The appearance of Parts I. and II. of Major H. G. Raverty's 'Notes on Afghanistan and part of Beluchistan,' will no doubt afford much gratification to students of Asiatic geography. The whole of Eastern Afghanistan is herein described, route by route, topographically and ethnologically, with that amount of erudition and detail for which the learned editor is so justly famed. As a study in comparative geography the collection of this exceedingly circumstantial and minute description of the country, with the numerous Indian Survey Reports on recent explorations, ought to be of considerable interest. It is utterly beyond the scope of these columns to review the extraordinary and laborious amount of information conveyed in the three hundred odd folio pages which make up the two parts already published, but we must take the opportunity of calling attention to the matter collected by Major Raverty on the subject of the ancient country of Bilaur or Bolor, a topic on which we dwelt in our number for May last, and to which Major Raverty adverted in a subsequent communication to us.* In our note we drew attention to Major Biddulph's opinion, laid down in his book, 'Tribes of the Hindoo Koosh,' that Bolor is probably identical with Iskardo, a place which it seems is commonly called "Palor," "Balors," and "Balornts," by the inhabitants of Gilgit, Hunza, Nagyr, and the valleys to the westward, and we hazarded the opinion that Bolor must have been a small highland state near Hunza and Nagyr. This view was opposed by Major Raverty, and in his "Notes" he now explains the precise locality he assigns to Bolor or Bilaur, according to the more or less precise accounts furnished by the Mirza, Muhammad Haidar, and other Musalman historians and geographers, and the statements of some European travellers. Bilaur or Bilauristan consists of the mountainous country bounded on the north by the Hindu Kush range from the Do-Rahah (Dora) Pass to the 74th meridian of longitude, and thence by the mountains which form the water-parting between the Kunjut Valley and the Yarkand river, and merge in the Great Snowy Mountains, bounding Balti on the north. (This, it may be observed, distinctly includes Hunza and Nagyr, which we ventured to associate with Bolor). Westward its boundary appears to have been the Hindu Kush, and eastward the territory of Balti. Its southern limit was that remarkable range surveyed and described by Colonel Tanner a few seasons ago, and separating Chitral, Mastuj, Yasin, Gilgit, and Nagyr (all of which appear to have been included in Bolor), from Swat, Bashkar, and the valley of the Indus. The position and limit of this much discussed region of Bolor are thus defined with considerable exactitude.

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* See vol. ii. p. 765.

M. Severtsof's Journey in the Pamir.—As mentioned in our August number, M. Severtsof has been engaged in comparing the results of his last journey in the Pamir with his previous explorations in Central Asia, and he has now formulated some of the facts arising from his observations. These are as follows:—The Pamir is not a table-land, and has no steppe region up to the height of about 12,000 feet. Up to an elevation of some 14,000 feet the rivers flow in valleys, which never exceed about thirteen miles in width. This peculiarity occurs also in the Tien Shan and Tibet, where narrow valleys are found at a considerable elevation. There are, however, no lofty plateaux in the Pamir, where the mountains rise in lofty ridges 6000 or 7000 feet above the level of the valleys. In the Pamir mountain-system M. Severtsof states that 19,000 feet above the level of the sea is often reached, while three mountain-groups attain an absolute elevation of 25,000 feet. He says, however, that these elevations do not alter the generally symmetrical character of the Inner Pamir. The mountain lines stretch in the direction of the meridian, and seldom strike out at right angles, in which respect they resemble those in the Tibetan system, while in the Tien Shan there is a tendency to parallel ranges. M. Severtsof is of opinion from the evidence he obtained that in the Inner Pamir, the groundwork of the system, the elevation, which in 12,000 years has risen 600 feet, is still going on.

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* 'Proceedings' for August 1881, p. 498.

Cambodia and Siam.—As mentioned in our report* at the time, a memorandum by M. Boulangier, who had become engaged in surveying operations in connection with projected lines of railway, was read at the meeting of the Geographical Society of Paris on June 3rd, embodying some of the geographical and other observations, made during his journeys in Cambodia and Siam. Cambodia, M. Boulangier points out, may be divided into two regions of nearly equal size, but wholly distinct from an agricultural point of view, viz. Upper Cambodia, which is not liable to inundation, and possesses a rich and cultivable soil; and Lower Cambodia, which is submerged by the waters of the Mekong during sometimes even four months of the year, and is consequently only suited for rice cultivation. In Cambodian territory the Mekong is everywhere navigable, and receives from both banks affluents deep enough to admit of large junks penetrating for 40 miles into the interior during three months in the year. At Phnom Penh in flood-time the Mekong runs into the Tonle (or Tale) Sap, called by Europeans the Great Lake, in which enormous quantities of mud are deposited every year, so that the deeper parts silt up to the extent of an inch and a quarter annually, while in the shallower portions the bed is raised about six inches. In less than a century it will cease to exist as a lake, and will be converted into a tributary of the Mekong. At the present time the Tonle Sap has a depth of some 13 feet during half the year, and it receives a number of streams, which in flood-time are of considerable size. Including the country drained by these, the Tonle Sap has a basin as large as that of the Mekong and much richer, for it extends into the principalities of Battambong and Angcor, which a few years ago were annexed to Siam. The Tonle Sap appears, from M. Boulangier's investigations, to have been originally a gulf; the sea at that time stretched to the Angcor-Reat Mountains, north of Angcor-Thom, but was gradually driven back by the alluvial deposits of the Mekong. In the last geological period, which M. Boulangier considers to date back from 1000 years ago, the Gulf of Angcor communicated with the sea by two mouths—Kabin and Compong-Som, and the mountain masses of Pô-sat and Compong-Som formed an island. Gradually by the action of the rivers the bed of the sea was raised, until the plains of Cochin China were formed. At the same time the Gulf of Angcor was transformed into a river and lake tributary to the Mekong, and will before long become a mere rivulet. All these great changes in the face of the country are produced by soil brought down from the great mountains of the interior. After the basins of the Mekong and Tonle Sap in importance comes that of the Gulf of Siam, which only includes one river of any length, the Compong-Som, and that not a navigable one. The water-parting of the Mekong and Tonle Sap basins is not very sharply defined, or to speak more precisely, is a vast ferruginous plateau, which has a rapid fall to the river. In this plateau are found large quantities of sesquioxide of iron and a rich bed of *kaolin.* On the side of the sea the limits of the Tonle Sap basin are marked by the Phnôm-Ktiôl and the Cardamum mountains, among which are some of the greatest elevations of Cambodia. Parallel to this chain runs that of Pô-sat, which is of some height. These mountains, which, we are told, are of crystalline formation, are covered with impenetrable forests, and gold and several varieties of precious stones, including diamonds, are found among them. All the mountain chains gradually diminish in height and disappear in the Battambong principality. The basins of the Gulf of Siam and the Mekong are separated by a tract of country of slight elevation, but of great interest from a mineralogical point of view. The plateaux of the Compong province are all covered with forests of caoutchouc, and gum and lacquer trees, and pepper is found to flourish there. The kingdom of Cambodia—to sum up—is easily accessible in all parts of the Pô-sat mountain region, the soil is fertile, and its wealth in mines and forests is exceptionally great; and when the inhabitants can be induced to take an interest in labour and the consequent development of the country, its revenue, M. Boulangier is convinced, will be increased sevenfold.

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* See *ante*, p. 438.

Mr. R. Watson's Surveying Expedition across Queensland.—In the early part of the present year, Mr. Robert Watson, late Engineer-in-Chief of Victoria, was engaged, by order of the Queensland Government, in surveying a route for the projected trans-continental railway from Roma to Point Parker, on the Gulf of Carpentaria. The party left Roma on January 14th, and proceeded first to Charleville. For 70 miles from Roma the soil was found to be as rich as any that can be found in the Australian colonies, very lightly timbered, and the country presenting no obstacles to railway construction, but after the Mitchell Downs were passed, the country became scrubby and slightly rangy, and the soil less rich. About 35 miles before reaching Charleville, the party came to the Angellalla range, which is the only one of any importance met with on the way to the Gulf of Carpentaria. Before leaving Charleville for Blackall, Mr. Watson learned that the valley of the Ward river was the most suitable for his purpose, and the soil much richer than on any other line, but it was then impracticable owing to scarcity of water and of feed for his horses. He therefore determined to follow the Warrego and Nive rivers, and proceed by way of Ellangowan, Burenda, Caroline, Nive Downs and Tambo, to Blackall. He found the country exceedingly good all the way, lightly timbered for some distance, and then consisting of magnificent rolling downs. The route he took was, however, too circuitous for a railway, but there are two others, either of which would be better:—one following the divide between the Ward and Nive rivers to Tambo, and the other passing through the rich land on the west side of the Ward river to Blackall. At Blackall Mr. Watson was joined by Mr. Frederick Hann, one of the most accomplished bushmen in the colonies, who then, at the request of the Queensland authorities, undertook the general management of the expedition. The party proceeded by way of Aramac to Mount Cornish, and found the country to consist largely of magnificent open downs, though some scrub was passed. After Mount Cornish was left, the journey from Muttaburra to Winton proved a very difficult one, as owing to the rain, the rich brown soil clogged the wheels of the waggon. From Winton the party travelled over Ayrshire Downs, through which the Wokingham Creek runs, and after passing the Diamantina river, crossed the Great Dividing Range, which is in reality imperceptible. This, indeed, divides the Western from the Gulf waters, but otherwise would not be noticeable. A nearly north-westerly course was then taken, through excellent country, to the Cloncurry river, which was crossed near Fort Constantine. The same general direction was afterwards followed to the Leichhardt river. Having travelled down the west bank of this river for 12 miles, the expedition came to a large creek; and learning that there were many others nearly as large as the river itself running in from the western side, they recrossed the Leichhardt and followed the eastern bank to Floraville or Chandos, when they again crossed about four miles below the falls, near the confluence of the Alexandra or Landsborough river. About 18 miles above the falls at Floraville there is a place suitable for a bridge, the river banks consisting of bold, rocky cliffs, with a ravine between, through which ordinary floods pass. From Floraville to Burketown the country is very open, but rough and uneven. About 12 miles from Burketown the party crossed the Nicholson, which is a large river, with a sandy bed, opening into two branches, and thus forming two mouths into the Gulf of Carpentaria. About a mile beyond the Nicholson the expedition came to country beyond the reach of any floods, and then travelled for some 20 miles through a good grazing district. For the last 30 miles before reaching Point Parker, several salt-water inlets were met with, which might be avoided by taking a more westerly route. These inlets, or salt-pans, are very peculiar, being narrow patches of sand extending for miles, with good land close to them, and running parallel to the coast.—The principal rivers, which would probably have to be crossed by a line of railway between Roma and Point Parker, are the Maranoa, Warrego, Ward, Alice, Thomson, Cloncurry, Leichhardt, Albert, and Nicholson, and there are also numerous creeks which almost deserve to be called rivers.—With regard to the country generally, through which the expedition passed, Mr. Watson reports that it is comparatively level from one end to the other, there being only one range worth noticing, viz. the Angellalla, about 35 miles from Charleville. The soil is, for nearly the whole distance, extraordinarily rich, and suitable for either pastoral or agricultural purposes; the southern portions for either cattle, sheep, or the cultivation of ordinary crops, and the northern for cattle or tropical products, such as sugar, cotton, rice, &c.—It may be interesting to add that another expedition under Major-General Feilding, who is accompanied by our Associate, Mr. John Robinson, C.E., left England last June to make an independent survey of a route for a railway across Queensland, and that their expedition started from Brisbane early in August.

Encouragement of the Study of Geography.—It is announced that a prize of 25,000 francs (1000*l.*), given by his Majesty the King of the Belgians, will be awarded in 1885 to the best work—to be published within four years—on the means to be employed and the measures to be taken for popularising the study of geography, as well as for the efficient teaching of the same in schools of all kinds.

French Scientific Expeditions.—Through the courtesy of M. Raoul de Saint Arroman, Secretary of the "Commission des Missions Scientifiques," in the Ministry of Public Instruction at Paris, we have been favoured with a memorandum showing the principal missions entrusted to French travellers in the last year or two. The names of no less than forty-eight gentlemen are enumerated, many of whom, however, are not strictly speaking scientific travellers, but are engaged in literary and other researches in various parts of Europe. Of the distant expeditions thus encouraged by the French Minister, the most important is without doubt that of M. Savorgnan de Brazza and Dr. Ballay, in the Ogowé region of West Africa.—In Tunis, M. Roux has directed his attention to topographical investigations and botanical researches; M. Georges Revoil has been occupied in Somali-land on an expedition from which, as we have already recorded, he has but lately returned; and Captain Matheis has been charged with a mission to Equatorial Africa, but the object and locality are not specified. In Madagascar M. Delagaud has undertaken geographical exploration and ethnographical studies, while M. Lantz has also devoted himself to explorations and natural history researches in certain portions of the island.—In Asia Lieutenant Delaporte is still attached to his old field in the archæological exploration of Cambodia, and Dr. Maget has a mission for medical and anthropological research in Japan; M. Chantre is to study the neighbourhood of the Caspian Sea from an anthropological and a zoological point of view, while M. Clayton studies the ethnography of Kurdistan.—Dr. Jules Crevaux still holds a mission for exploration in the region of the Upper Amazons, and archæological work is well represented by M. Charnay in Yucatan, and M. Pinart in Central America, Peru, Bolivia, Ecuador, &c. Dr. Montano, to whose journey we have already referred,* has but lately returned from the scientific mission to Malaysia and the Philippine Islands, which for some time he shared with Dr. Paul Rey. MM. Brau de St. Pol Lias and de la Croix also returned about the same time from their honorary mission to Sumatra in connection with the colonist-explorer project. The latter has also undertaken a series of investigations in the mining districts of Lower Pârak. M. Alfred Marche, who was for some time the companion of M. de Brazza on the Ogowé, appears to be still engaged, under the auspices of the Minister, on his researches in the Philippine Islands.—M. de Montgascon has been charged with a mission to conduct a geographical and archæological exploration of different parts of Montenegro, and particularly the valley of the Zeta.

Obituary.

Vicomte A. Duprat.—With deep regret we have to record the death, on the 24th August, of one of the most respected and most useful among the Fellows of our Society, the Vicomte Alfredo Duprat, for many years Consul-General for Portugal in London. His life had been an active and distinguished one. In his early days he was engaged in the civil war against Don Miguel, and was decorated for his military services. For a very long period, viz. during the Governorships of Sir Harry Smith, Sir George Grey, and Sir Philip Wodehouse, he filled the important position of representative of Portugal at the Cape of Good Hope, in the Court of the Mixed Commission appointed by the conjoined powers of Great Britain, America, and Portugal, for the suppression of the slave trade on the East Coast of Africa. To his great honour it must be said that, although the owners of the dhows were in almost all cases the subjects of the King of Portugal, the Chevalier Duprat was always faithful to the duties of his high position, and as honestly desirous as any Englishman to effect the suppression of the odious traffic. In fact, in spite of his nationality, he was very English in his tastes and affections. Courtesy and social geniality, which are such important factors in the business of life, he possessed in high degree, and these qualities won him the warm regard of all those—and they were many—who enjoyed the advantage of his friendship or acquaintance. The result was that the colonists of the Cape of Good Hope looked upon him as one of themselves, and forgot that he was a Portuguese, though officially representing his country. Indeed, so much of an Englishman was he that, at the critical period of the Indian Mutiny, he, with the sanction of his own Government, raised and organised the Regiment of Cape Volunteer Artillery, of which he held the rank of colonel for several years. During his residence in Cape Town he not only visited every district in the Colony, Natal, the Orange Free State, and the Transvaal, but he negotiated in 1869 the Treaty with the South African Republic, through which it became finally decided that Delagoa Bay, Lourenço Marques, belonged to and formed part of the Portuguese possessions. In 1876 he successfully negotiated with the representative of the Orange Free State in London, a treaty of commerce and good will, and was entrusted with the task of personally securing the necessary exchange of ratifications at Haarlem. But what calls for most especial recognition and thankfulness from our own Society to the late Vicomte Duprat is the unvarying heartiness and forethought with which he came to the assistance of English travellers in Africa. Among others, Livingstone, Galton, Archdeacon Mackenzie, Grandy, Cameron, and so late as last year, Mr. Guy Dawnay and Captain Phipson-Wybrants have all borne grateful testimony to the willing and most valuable exertions which he has made in securing them facilities in the interests of African geographical discovery. The late Vicomte died at the age of 71. He was elected Fellow of our Society in 1856.

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* See *ante*, p. 592.

Rev. F. W. Holland, M.A.—It is with much regret that we record the sudden death of the Rev. Frederick Whitmore Holland, M.A., of heart disease, on the Nissen, near Thun, Switzerland. Mr. Holland was born in 1837, and was the son of a country gentleman residing at Dumbleton, near Evesham; he was educated at Eton and Trinity College, Cambridge, where he took the degree of Bachelor of Arts in 1860, and of Master of Arts in 1864. He took Holy Orders in 1862, and was successively Curate of St. Andrew, Manchester (1862–5), Assistant-Minister of Quebec Chapel (1865–72), and Vicar of Evesham, 1872; in 1878 he was appointed Rural Dean of Evesham. Mr. Holland visited the Peninsula of Sinai in 1861, and again in 1865, and a brief account of his observations was read[*] before our Society on April 23rd, 1866. He joined the Committee of the Palestine Exploration Fund in November of that year, being associated with Mr. Grove as Honorary Secretary—an office which he retained to the time of his death. He read an important paper on the Peninsula of Sinai at our evening meeting of May 11th, 1868, which was published in the thirty-eighth volume of our Journal. The valuable map of the Peninsula, prepared from Mr. Holland's observations on the ground, which should have accompanied that Memoir, appeared in the succeeding volume, with illustrative notes by the author. In 1868 Mr. Holland took the leading part in raising the Sinai Survey Fund, and attached himself, as a volunteer, to the expedition despatched under the command of our Associate, Captain (now Lieut.-Colonel Sir) C. W. Wilson. Returning to this country before the officers of the expedition, Mr. Holland gave some account of their labours in a valuable paper,[†] entitled 'Recent Explorations in the Peninsula of Sinai,' which was read at our meeting of April 26th, 1869. On the occasion of this expedition a grant of scientific instruments was made to Mr. Holland by our Council. Some ten years later he again applied to the Society for the loan of a number of instruments, and in the spring of 1878 he started on another short journey to Sinai, the results of which he communicated[‡] to the Council immediately on his return to England at the beginning of June in that year. In all we believe our Associate paid some six visits to the Peninsula. In recognition of the friendly assistance and countenance which he had always received from this Society, Mr. Holland, in his private capacity, and not as an officer of the Palestine Exploration Fund, very liberally presented to our Map-room in May 1880, a copy of the map in 26 sheets (scale 1 : 63,360, or 1 inch to 1 mile) of Western Palestine, which was prepared from surveys conducted for the Palestine Exploration Fund by Lieutenants C. R. Conder, R.E., and H. H. Kitchener, R.E., during the years 1872-7, and photozincographed and printed, under Colonel A. C. Cooke's supervision, at the Ordnance Survey Office, Southampton. Our Associate was a man of singular perseverance and tenacity of purpose, and never spared himself any effort required to accomplish an object which, in his opinion, was right and desirable. He founded several institutions for the benefit of the working-classes, and it was entirely owing to his public-spirited exertions that the Grammar School at Evesham was re-established. Mr. Holland, who was elected a Fellow of our Society in 1867, died on the 27th of last August.

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[*] See R. G. S. Proceedings, vol. x. p. 158.

[†] Ibid., vol. xiii. p. 204.

[‡] Ibid., vol. xxii. p. 455.

Major S. Anderson, R.E., C.M.G.—The death is announced of Major Samuel Anderson, R.E., C.M.G., which occurred at Dalhousie Grange, Bonnyrigg, Midlothian, N.B., on September 11th. Our late Associate was born in London on November 15th, 1839, and was educated first at St. Andrew's University and the Military Academy, Edinburgh, before he entered the Royal Military Academy, Woolwich, on August 11th, 1857. He obtained a commission in the Royal Engineers in December 1858, and in September of the following year was appointed surveying officer on the staff of our Associate Lieutenant-General Sir J. S. Hawkins, Her Majesty's Commissioner for marking out the land boundary between British and United States territories in North America. Lieutenant Anderson returned to England in July 1862, but was employed in London till February 1864, in completing the maps of the Commission. In conjunction with Captain (now Lieut.-Colonel Sir) C. W. Wilson, R.E., he made a preliminary expedition through Palestine in 1865–6, in order to ascertain the best mode of conducting the scientific examination of the country, which has since been carried out by the Palestine Exploration Fund. From November 1866 to November 1871, our Associate was Assistant-Superintendent of the Schools for Telegraphy and Photography at the R.E. Establishment, Chatham, and was promoted to be Captain in 1872, in which year he was appointed Chief Astronomer of the North American Boundary Commission, under our Associate Major Donald R. Cameron, R.A., who, in conjunction with a commissioner from Washington, was instructed to lay down the boundary line between British and United States territory, from the Lake of the Woods to the Rocky Mountains. Captain Anderson was afterwards employed in London till June 1876, in preparing the record maps of the Commission, and at our evening meeting of March 27th in the same year he read a paper on the subject, on which occasion he exhibited a number of pictorial illustrations of the region traversed by the expedition. This paper was afterwards printed *in extenso* in the forty-sixth volume of our Journal, with a map of the North-West Territory, showing the British and United States boundary line surveyed and marked out by the Joint Commission. In September 1876, Captain Anderson was appointed Assistant-Inspector of Submarine Defences at the War Office, and in May following was made a C.M.G. for his services in North America. In 1879 he was selected to be Her Majesty's Commissioner for the demarcation of the Servian frontier under the Treaty of Berlin, and was promoted to be Major a few months later. Our Associate, who joined the Society in 1876, had lately succeeded Lieutenant-Colonel W. Crossman, C.M.G., as Inspector of Submarine Defences, in the Ordnance Department of the War Office.

Major-General Sir Vincent Eyre, R.A., K.C.S.I., C.B.—We have also to announce the death of Sir Vincent Eyre, a distinguished Indian officer, at Aix-les-Bains, Savoy, on September 24th. Sir Vincent Eyre was born in 1811, and educated at Norwich Grammar School and afterwards at Addiscombe; he obtained a commission in the Bengal Artillery in December 1829. He served in the Afghan war of 1841–2, and during the retreat of General Elphinstone's army was taken prisoner and conveyed to Kabul. After eight months' captivity he escaped, and joined General Pollock's relieving force. His experiences in Afghanistan were published in a well-known work,* which has long been a standard book on the country. Sir V. Eyre served with great distinction during the Indian Mutiny, being present at the relief of Lucknow by both Sir Henry Havelock and by Sir Colin Campbell. He was promoted for his services during the Mutiny, and was also made a Companion of the Bath, and a Knight Commander of the Star of India, and more than once received the thanks of the Governor-General of India in Council, as well as the Indian medal with two clasps. In addition to the work mentioned above, our Associate published in 1856 a book on metallic boats, &c., and in 1869 'A Retrospect of the Afghan War, with reference to passing events in Central Asia' (with map), besides, we believe, several treatises on military and scientific subjects. Sir Vincent Eyre retired from the service in 1862, with the rank of Major-General.—He was elected a Fellow of our Society in 1856, and was at one period a frequent attendant at our meetings.

Colonel T. G. Glover, R.E.—Colonel Thomas George Glover, late of the Royal (Bengal) Engineers, died suddenly on September 12th at Neuenahr, Rhenish Prussia. He obtained his first commission in the Bengal Engineers in 1847, and about the end of 1849 was appointed an assistant executive engineer in the Public Works Department. He afterwards saw active service in the Punjab, and was present at the siege of Multan, and other engagements of the campaign. He was also employed during the Indian Mutiny. He was promoted to the rank of Captain in 1858, and in the following year was appointed superintendent of the Western Jumna Canals in the Punjab, and was engaged in the construction of those great irrigation works, which have had such a beneficial effect on the development and fertilisation of Northern India. Colonel Glover retired from the service in 1870, and was elected a Fellow of our Society in the same year.

CORRESPONDENCE.

The Submarine Volcano off Cape Colville, N.Z.

AUCKLAND, NEW ZEALAND, *August* 12, 1881.

Some weeks since a report was brought to Auckland by Captain Farquhar, and a short time after confirmed by Captain Andrews, that a submarine volcano existed off Channel Island, Cape Colville, New Zealand. Further particulars have now been received. Captain Fairchild, of the New Zealand government steamer *Stella*, was instructed to investigate the matter, and has sent in his report to the Marine Department. It is no great distance from the mainland, Channel Island bearing north by west three-quarters of a mile. The water was quite cold and in constant motion like a spring for a circle of 100 feet diameter, and was discoloured by the mud discharged. The yellow water drifted away with the tide, gradually spreading out till lost to sight. Soundings were taken, and the depth found to be 24 fathoms, but on taking the *Stella* immediately over the centre of the disturbance it was found to be but 20 fathoms. The lead came up quite cold, and brought up a few broken shells. The question arises whether a new island is in course of formation, and the result will be watched attentively. The fact that the centre is already 24 feet above the surrounding level seems to point to this conclusion. The whole of Auckland province, including the islands in the Hauraki Gulf, teems with extinct volcanoes, and there has never been any other opinion but that their origin was strictly volcanic.

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* 'The Military Operations at Kabul 1841–2, with a Journal of Imprisonment in Afghanistan.'

It is right in the track of the small coasting vessels, the large steamers generally taking a course to the eastward of Channel Island. The volcano in this case must be intermittent, as I sailed right over it on August 4th, when there was not the least sign of anything unusual, the water not being even discoloured.

H. M. HAYWARD.

PROCEEDINGS OF THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION.

JUBILEE MEETING, YORK, 1881—(*continued from p.* 635).

Monday, September 5th.

Progress of Arctic Research since the Foundation of the British Association. By C. R. MARKHAM, C.B., F.R.S.—A review of the progress of Arctic discovery may fitly be made in the city of York for two reasons. In the first place, it was in York that the first meetings of the British Association took place just fifty years ago, and the Association, especially this Section of it, has given hearty support and encouragement to northern exploration. In the second place, there is no county in England that has produced a greater number of Arctic worthies than Yorkshire.

Sir Martin Frobisher, who commenced the glorious work on the American side, was born at Altofts, in the parish of Normanton. James Hall, who led an expedition to Greenland in 1612, Andrew Barker, the companion of Baffin in his first northern voyage, and Captain Marmaduke, who was the first to explore the northern shores of Spitzbergen, were natives of Hull. Luke Fox, who not only made important discoveries to the north of Hudson's Bay but also wrote a most entertaining narrative of his voyage, was also a Yorkshireman. Above all, Yorkshire is the native land of James Cook, the greatest of England's sailor explorers, who extended our Arctic knowledge along the coasts on both sides of Behring Strait. Dr. Scoresby, too, hailed from Whitby, and in him Yorkshire produced the first scientific explorer in the mercantile marine. Both he and his father were models of the best type of British seamen; while five generations of intrepid whaling captains made Arctic voyages from Hull and Whitby for upwards of two centuries.

We thus have a character to sustain; we must show that the spirit which produced such men is not yet dead amongst us, and we can furnish no more conclusive proof than by recalling the labours of our own contemporaries and by showing our sympathy for the work they have done, and our appreciation of the value and importance of what remains to be accomplished.

I would, therefore, invite the Section to devote a short time to this branch of geographical inquiry, and first to join me in a hasty glance at the state of our Arctic knowledge fifty years ago, when the Association held its first meeting in this city. All England was then anxiously looking out for tidings of Sir John Ross and his illustrious nephew, who had long been absent in the icy regions. Sir George Back was hurrying to the rescue, and discovering the Great Fish River, with its mouth in the Arctic Sea; and when these heroic explorers had returned safely and received the hearty welcome they had so well earned, a large increase had been made to our knowledge.

In 1831 the Asiatic coasts within the frigid zone had already been delineated by the Russians. But on the American side only portions had been traced by Franklin, Back, Richardson, and Beechey. Much difficult work had to be done before the complete outline of Arctic America could be laid down. The western and northern shores of Spitzbergen had long been known, Ross had rediscovered Baffin's Bay and so vindicated the fame of that gallant old navigator, and Parry had pressed westward for 300 miles to Melville Island, on a meridian far to the north of the American continent. Lastly, the Rosses were engaged in the discovery of Boothia and King William Island. Not only was the whole vast region to the north of 82° entirely unknown, but also extensive tracts to the southward of that parallel, especially between Parry's westward track and the American coast.

The period covered by the labours of the British Association, and of its contemporary the Royal Geographical Society, has been a period of great though fitful activity, in the work of filling up these blanks and of increasing our Arctic knowledge. It is most important that we should bear in mind the objects of Arctic discovery during the present century. Those objects have not been commercial gain nor the discovery of a shorter route whereby to increase trading profits; nor have they been a foolish quest for some unattained point on the earth's surface. In the present century, the north-west and north-east passages have been sought in order that scientific knowledge might be extended, that the relations between land and sea over a vast area might be understood, together with the numerous other interesting facts connected with a previously unknown region. Increase of knowledge is the great object of Arctic discovery; an object than which none can be more useful, none more praiseworthy: and when once the attempt to secure it has been commenced, our efforts ought never to be relaxed until the great end in view is fully attained.

Following in this noble course, the discovery of the shores of Arctic America was completed between 1830 and 1854. The enterprises of Simpson and Dease, who succeeded, by means of perilous boat voyages, in connecting nearly all the work of former explorers, showed forth, in bold relief, the hardihood and resource of men trained in the service of the Hudson's Bay Company. They were followed by Dr. John Rae, who was the first to pass an Arctic winter almost entirely on his own resources. He and his party lived in a stone hut, without fuel of any kind to give warmth, maintaining themselves on deer and salmon. In the following spring (of 1847) they explored on foot the shores of a great gulf, thus connecting the work of Parry with that of Ross, and proving that Boothia was part of the American continent. In 1854, after passing a second winter in Repulse Bay, Dr. Rae established the insularity of King William Island. Thus the discovery of the whole outline of the coast of Arctic America was completed. It became known that it was washed by a sea which is confined to the north by a series of islands, except at the western section; and that this sea is generally navigable in the summer, owing to the great volume of water poured down by the Back, Coppermine, and Mackenzie rivers. It was also proved that the continuance of the channel was broken by the land called Boothia at the eastern end, and by the Melville Peninsula, which both extend northwards and separate Hudson's Bay from the north-west channel or passage, and have an important effect on the tides and the formation and position of ice-floes. It is these northward prolongations of land which constitute the difference between the achievement of a north-west and north-east passage. The North-East Passage has been made in a ship with comparative ease. The North-West Passage has never been made in a ship, and I believe it to be the opinion of Professor Haughton, based on considerations relating to tides and the configuration of the land, that it never will be so made. But the discovery of the Arctic coast of America threw light on important geographical questions, while the collections of the explorers enriched many other branches of science. The great utility of their work was crowned by the memorable discovery of the North Magnetic Pole.

The next great section of Arctic achievement includes the complete discovery and examination of the extensive archipelago extending northward from the American coast, and covering an area about 700 miles long by 500. In 1819–20 Sir Edward Parry had entered Lancaster Sound, and sailed westward on a parallel of about 75°, until he was stopped by heavier ice than had ever before been seen, to the west of Melville Island. Between this line of Sir Edward Parry and the American coast, and all to the northward of it, remained entirely unknown. Its discovery was completed by the Franklin Search Expeditions between 1848 and 1854. The object of Sir John Franklin's expedition was to make the north-west passage by connecting, along a sea route, the westward line of Parry from Lancaster Sound with his own discovery of a navigable channel further south, along the coast of Arctic America. The attempt failed, but it was made with a combination of knowledge, skill, and chivalrous daring which raises it above many a boasted success. The *Erebus* and *Terror* were advanced to a point in the right direction, far beyond any that has been reached from the eastward, before or since. If he had been aware of the insularity of King William Island, not yet discovered, and had hugged the coast of Boothia, it is possible that Sir John Franklin would have succeeded. But he could only act on the imperfect knowledge which then existed. He attempted to round the western extreme of King William Land, which was then believed to be a peninsula, so as to reach the channel along the American coast, and his ships were beset in the great ice block between the Atlantic and Pacific tides, which streams down from the stupendous ice seen by Parry to the west of Melville Island. Extrication from this position was impossible. Franklin and his band of heroes perished nobly in a glorious cause. "They forged the last link of the north-west passage with their lives." But the mere making of this passage was not the main object of their voyage. The presence in the expedition of Dr. Goodsir, one of the most rising naturalists in Scotland, and of some of the ablest and most scientific officers in the Navy, proves that the main object was the acquisition of valuable knowledge in all branches of science. It was an object for which many of the best men of our race have lived, and for which not a few have died.

The expeditions which were despatched to search for the missing ships and to ascertain their fate, were conducted on so large a scale, and with such energy and perseverance, that, within the space of six years, nearly the whole of the vast area of the Parry Archipelago, with its numerous islands and ice-encumbered channels, was discovered and explored.

It was for the purpose of these searches that the admirable system of naval Arctic travelling was conceived and developed by the genius of Sir Leopold M'Clintock. This system of sledge travelling involves most arduous and trying work. But the sufferings and hardships were eagerly and zealously faced in the cause of humanity, as they have since been encountered in the cause of science and of discovery. Before this system was introduced, Arctic research was in its infancy; for comparatively little can be done in and near a ship, beyond the observation of meteorological, magnetic, and tidal phenomena. But by means of extended sledge parties many hundreds of miles—nay, thousands of miles—of coast-line have been minutely examined, their geology, ethnology, zoology, botany, and physical aspects ascertained, and most valuable scientific results obtained. To the botanical importance of these operations no one has borne heartier testimony than our President, Sir Joseph Hooker, not only in his Address to this Section, to which we all listened with so much pleasure last Thursday, but also on other occasions.

You will remember his remark that the discovery of fossil plants in Arctic latitudes brought to the surface new data for the study of the present and past physical geography of the globe, and his reference to the wonderful facts revealed by their examination. Here, then, is one conclusive answer to those who doubt the practical value of Arctic work. The results of Arctic exploration in other branches have been as fully appreciated by many other men of science.

The searchers for Sir John Franklin traced the outlines of a vast archipelago of Arctic islands. They brought to light the condition of that archipelago in geological times, several interesting ethnological facts, the relative position held by its flora, and many other points of scientific importance. They brought back precious series of magnetic, meteorological, and tidal observations made at numerous points. They noted the direction taken by the tides and currents, the position where the Atlantic and Pacific tides meet, and the physical causes which influence the formation and accumulation of ice. It was observed that a body of enormously thick and quite impenetrable ice extends, at some distance from the shore, along the western section of the Arctic coast of America, and presses upon the western face of the Parry Archipelago; while a stream from it forces its way down the channel between Melville and Banks Islands, and abuts upon the north-west coast of King William Island. Here its position is immovably fixed by the meeting of the tides, merely swaying to and fro, from east to west and west to east, to the extent of a few miles in a year. It was in this stream, from the ancient ice which encompasses the Parry Archipelago, that Franklin's ships were beset.

The Franklin search expeditions thus performed an enormous amount of valuable scientific work, adding materially to the sum of human knowledge, in addition to the performance of the humane mission on which they were primarily employed. But it must always be remembered that the main errand of the search expeditions was in the cause of humanity. The scientific work was additional; yet I can say, from personal knowledge, that nearly all who served in those searches were also actuated by an earnest desire to advance the cause of science. We have with us, to-day, one Arctic officer, under whom I myself had the honour to serve in the Arctic Regions. I allude to Admiral Sir Erasmus Ommanney. He it was who discovered the first traces of Franklin at Cape Riley, he it was who made known to geographers, by his long and arduous sledge journey, the whole western coast of Prince of Wales Land. I may be allowed now to bear my humble testimony to the untiring zeal with which he conducted magnetic observations, often under very trying circumstances. I may add that no happier ship than the old *Assistance*, in Captain Ommanney's commission, ever crossed the Arctic Circle. Time will not admit of an enumeration of other Arctic officers who, during the Franklin searches, did good service to science. But I may mention that we also have among us, to-day, Sir Alexander Armstrong, whose remarkable discovery, when serving with Sir Robert M'Clure, of pine cones and acorns imbedded in the soil of Banks Land, was referred to by our President in his Address last Wednesday. Nor can the name of M'Clure himself be omitted, whose circumnavigation of America is one of the most memorable voyages of all time. These, and many other distinguished officers, were most indefatigable in the pursuit of knowledge, while they gained experience which has been, and will continue to be, invaluable to future explorers. The ample experience which was then acquired established the true methods for future polar research, which are now formulated into three Arctic Canons. The first is that, for satisfactory and complete results, an expedition must pass at least one winter in the ice in order to obtain complete series of observations. The second is that full results as regards geology, zoology, botany, and geography can only be secured by the despatch of extended sledge travelling parties. The third is that, to reach an advanced position within the unknown area, it is necessary to follow a coast-line, trending northwards, with a westerly aspect.

These three Canons are equally important, but the latter rule is that which has the most interest to the geographical inquirer. The experience of three centuries has taught us that inevitable failure and probable disaster are the consequences of pushing into the ice-floes away from land, while a successful advance is secured by keeping to a coast-line. Further, it is held that the best prospect of success is afforded by advancing along a coast trending northwards, with a westerly aspect. Such coast-lines usually have channels of open water along them, during some part of the navigable season. This fact in physical geography is ably discussed by Sir Edward Parry in his remarks at the conclusion of the narrative of his third voyage. He had observed that the eastern coast of any land trending north and south was more encumbered with ice than shores having an opposite aspect. The east coasts of Greenland, Spitzbergen, and Novaya Zemlya are more or less blocked with ice throughout the summer, while navigation along the western coasts may annually be performed without difficulty. The west side of Fox's Channel, along Melville Peninsula, is loaded with ice, but there is little or no ice on the east side. In Prince Regent's Inlet ice always clings to the western shore of the channel, while the opposite shore is comparatively free from it. In Behring Strait the same fact has been observed. On the American side the water is comparatively warmer, and is navigable every summer to Point Barrow, while the Asiatic side is usually blocked with ice. A general motion of the sea towards the west causes the ice to set in that direction, when not impelled by contrary winds or local currents; and Sir Edward Parry suggested that this constant westerly motion was connected with the motion of the earth on its axis.

In the period between 1858 and 1876 a great deal of valuable work was achieved by expeditions despatched from Sweden, Germany, the United States, and Austro-Hungary, as well as by English yachtsmen and Norwegian walrus hunters. Important as this work undoubtedly was, it consisted, with one exception, in partial extensions of our knowledge of localities already discovered, rather than in any marked advance across the threshold of the unknown region. But this in no way detracts from its value. Not only was Spitzbergen circumnavigated for the first time, the map of Novaya Zemlya corrected, the existence of channels extending northward from Smith Sound discovered, and an interesting portion of the east coast of Greenland explored; but most extensive additions were made to the scientific knowledge of all these localities. The great value of the work done by Nordenskiöld and his fellow labourers in Spitzbergen, Greenland, and Novaya Zemlya, to mention one among many workers in this field of research, has been fully recognised by all men of science.

But one expedition during this period not only filled in and completed former discoveries, but made an independent discovery within the unknown area, the immense importance of which cannot possibly be overrated. It had long been conjectured, from many indications, that extensive land existed far to the north, on the meridians between Spitzbergen and Novaya Zemlya. If this conjecture was correct, and the land trended far in the northerly direction, there would be another hopeful route for further research in the vast unknown region of the pole. Its accuracy was established by Lieutenants Payer and Weyprecht, in the Austro-Hungarian exploring ship *Tegetthof*, in August 1873, during her memorable drift in besetting ice. The new land, named Franz-Josef Land, was not only discovered but extensively explored. Lieutenant Payer, mindful of the second Canon for polar research, had carefully studied every detail of Sir Leopold M'Clintock's system of sledge travelling, with most useful results. Without his journeys the work of the Austro-Hungarian Expedition would have lost more than half its value. But by sledge travelling Lieutenant Payer established the fact that the newly discovered land was so extensive as to bear glaciers on a vast scale, and that it extended northward almost to the 83rd parallel.

This review would be very incomplete if I omitted to refer to the efforts that have been made to explore the vast inland glacier of Greenland, by Professor Nordenskiöld, and more recently by several Danish officers. There are few more important investigations in the whole range of geography than those relating to the movement and physical aspects of the vast Greenland glacier. When we read of great rivers, with banks of blue ice as resplendent as sapphires; of columns of white steam rising into the blue sky, and showing the place where a river is plunging its whole volume down into an immeasurable abyss; we might almost think that such stories were the fruit of some imaginative poet's wildest dreams. Yet they are contained in the precise narratives of a scientific observer. Truly the work of Arctic explorers is as romantic and interesting as it is useful.

Our President, in his Address, referred to the importance of that department of geography which treats of the labours of our earlier explorers. This department has not been neglected, as regards Arctic geography, during the period under review. The narratives of the voyages of the Zeni, of Frobisher, of Hudson, of Davis, and of Baffin, have been reprinted and carefully edited. And it should be borne in mind that the work of these glorious old navigators is not merely of historical and antiquarian interest. Much of it is still practically useful. For instance, it would not have been possible for Professor Hansteen to construct the first of his series of magnetic variation charts without the observations taken by Baffin in the Arctic Regions between 1612 and 1616; and the labours of Hudson in the same field have also been utilised.

But to return to recent efforts in the field. The gallant enterprises of other countries at length awakened the English people to the practical scientific value of Arctic discovery. For years the late Admiral Sherard Osborn had urged the importance of such work from every point of view. At length our President, Sir Joseph Hooker, accompanied by Sir Henry Rawlinson and Admiral Osborn, had an interview with the Prime Minister, and in October 1874 it was announced that an English expedition would be despatched in the ensuing year, the objects being the exploration of the region round the pole and the encouragement of that maritime enterprise which has ever distinguished the English people.

The Expedition of 1875, under the command of Sir George Nares, was planned in exact accordance with those three Arctic Canons which long experience has proved to be essential to success. The ships were prepared to winter within the unknown area, extended sledge travelling formed a leading part of the scheme, and a route was selected along a coast-line trending northward. This route led up the channel leading from Smith Sound, at the extreme north end of Baffin's Bay, to the limit of the unknown. The object was to explore and secure all attainable scientific results, within the area that it was possible to cover by the Smith Sound route.

Those results were fully secured, and one more good and useful piece of work was done. By navigating along the land trending north, the *Alert* crossed the threshold of the unknown region, reached a point at which the land turned east and west, and there wintered; thus fully confirming the accuracy of one Arctic rule. The *Alert* reached the highest northern latitude ever attained by any ship, she wintered further north than any ship ever wintered before, and Captain Markham planted the Union Jack on the most northern point ever reached by man. These were great achievements, reflecting credit on the seamanship of Sir George Nares, and on the gallantry and hardihood of his officers and men. But scientific results were the main objects of the expedition.

The use of an Arctic winter is to register a complete series of observations in an advanced position, for at least one year. The experience of Sir George Nares's expedition proved the importance of that object, for the most interesting meteorological observations were made in November and December. In those months a remarkable rise of temperature was found to be synchronous with the so-called Greenland *Fohn*, observed at the Danish settlements further south. This was one out of many interesting results of wintering at the most northern position in which that season was ever passed.

The sledging operations of 1876 led to the discovery of 300 miles of new coastline, which threw light on the physical geography, geology, and natural history of a new region—the most northern region that has ever been explored, and for that reason more especially interesting. It was found that the same ancient ice which had been observed by Collinson to the north of the American continent, by Parry to the west of Melville Island, and by M'Clure and M'Clintock to the west of Banks and Prince Patrick Islands, continued along the newly discovered coasts facing north. It is from 80 to 100 feet in thickness, formed by slow accretions, and quite different from any that is met with in navigable Arctic seas. It is subject to annual disruption in July, when the whole mass is in motion, driving backwards and forwards with the winds and currents, but with its main course towards the east. The absence of flights of birds to the north indicated that there was no open water, and no land in that direction. The discovery of these physical conditions over an extensive area, which has helped to connect and explain similar conditions in other parts of the Polar Regions, is one important result of the late expedition. The geological work of the *Alert* and *Discovery* comprised a collection of rocks and fossils at every point from Cape Isabella at the entrance of Smith Sound to the most extreme point that was reached, and the discovery of tertiary coal in 82° N., proving the former existence of miocene vegetation to that parallel. Mr. Wallace, in his 'Island Life,' says that "one of the most important of the scientific discoveries of the last twenty years has been that of the relics of a luxuriant miocene flora in the Arctic Regions." Our President has told us that these discoveries opened up a new channel for investigating the problem of distribution. But it is clear that the full results of these discoveries cannot be attained until the exact extent and position of the miocene forests are delineated over the whole extent of the unknown polar region. If, too, the polar area was the centre of origination of all the successive phases of vegetation that have appeared on the globe, its investigation becomes still more interesting. The expedition of 1875–76 also made an exhaustive collection of the biology of a region previously almost entirely unknown, as well as the whole *flora* of that region; and complete series of meteorological, magnetic, and tidal observations were taken at two different points, both further north than any vessels had ever reached before.

These results were in accordance with the anticipations of scientific men, based on former experience. As regards geography, not only was fresh knowledge acquired, but that fresh knowledge supplied a clue to several previously isolated and unexplained phenomena in other parts of the Arctic regions. In this way the means of generalisation were supplied on one or two important points, and this will in future be even more likely to be the reward of invading the unknown polar area from different directions.

We find, therefore, that in every particular the results of the Arctic Expedition of 1875–76 justified the anticipations based upon former knowledge and experience. The examination of that portion of the previously unknown area which could be reached by the Smith Sound route was satisfactory, and completed the work in that direction. Consequently those reasons for continuing polar discovery which led to the despatch of the last expedition are now as strong as they ever were.

Since the return of Sir George Nares in 1876, the greatest northern achievement has been the voyage of Professor Nordenskiöld along the north-east passage. The great Swedish explorer had prepared for this enterprise by the most exhaustive study of the subject in all its bearings, and by two voyages of reconnaissance, so that he may almost be said to have commanded success. The results of the voyage of the *Vega* are most valuable, as confirming and piecing together all previous work, and establishing the broad facts bearing on the hydrography of the Siberian Arctic Sea.

Passing all this briefly in review, we have before us the results of Arctic enterprise during the period which embraces the labours of the British Association. In 1831 there were only unconnected and isolated discoveries in various directions. Now there is some approach to generalisation, to a comprehension of the geography of the Arctic regions, so far as discovery has extended, as a whole. This is the great result. Just as the later moves in a well-contested game are more important than those at its opening, so each succeeding move in the work of exploration is more important than that which preceded it. At first mere isolated facts were ascertained, but as discovery advanced and these became more numerous, they began to explain each other. The whole physical economy of the polar region will thus gradually be brought to light, generalisation will become more practicable, and at last the broken puzzle will be displayed as a beautiful and harmonious mosaic.

Yet a great deal remains to be done. The work of which England has reason to be so proud is not half completed. All to the north of 83° is still a blank. The insularity of Greenland is not yet ascertained, nor the relations between ice and land over the area between Aldrich's furthest and Prince Patrick Island. Wrangell Land remains to be explored, and the region north of the New Siberia Isles. If there are no tidings of the *Jeannette* we are bound to aid in the search for the rescue of her gallant crew. Above all, the route northward along the west coast of Franz-Josef Land towards the Pole must be explored.

Geographers must not allow the subject to drop. Those who have striven for years to preserve the continuity of polar research have to consider the next move in the game in accordance with its established rules. We must study the means of reaching another coast-line trending northwards into the unknown region, with a western aspect.

Looking round the circle which divides the unknown from the known, we find another such land in that Franz-Josef Land discovered by Payer and Weyprecht. There was an apparent difficulty in reaching this land because its most southern shore is in 80° N., almost as far north as the most northern part of Spitzbergen, and an ice-laden sea intervenes between the open water and the first base of operations. But this ice-laden sea is backed by land at no great distance. It is consequently an exception to the rule against pushing into ice-floes away from a coast-line. It is known to be navigable in August and September. This was proved by Payer in 1871, by the Dutch Expedition in 1878, by Captain Markham and the Dutch in 1879, and by Mr. Leigh Smith in 1880, when he reached Franz-Josef Land in a steamer, made important discoveries along it in August, and ascertained that the furthest western land he saw trended north and west. Mr. Leigh Smith has again sailed this year in the same steamer, still further to demonstrate that a base of operations on Franz-Josef Land may generally be reached, in an ordinary season. Before he sailed the Council of the Geographical Society bestowed upon this gallant and persevering yachtsman the gold medal—the highest honour it has it in its power to confer, and which he so well deserved.

From this base of Franz-Josef Land a steamer may advance northwards along the west coast, and all experience leads to the belief that so long as that coast trends in a northerly direction, a steamer may, in most seasons, succeed in making her way along it. A vast field of discovery will thus be opened, promising all the valuable results that have ever been anticipated from polar research. By this route we have the prospect of the attainment of a very high northern latitude for winter quarters, the exploration of an unknown and peculiarly interesting region by means of sledges, and security for a safe retreat.

The Royal Geographical Society, and this section of the British Association, have ever been foremost in advocating the continuance of Arctic research, and in demonstrating its scientific value. We should strive to preserve the continuity of our efforts, and when the time comes, as it came before and as it will surely come again, when those efforts bear fruit, and the general public, owing to some unforeseen but propitious accident, again becomes alive to the importance of the subject, geographers and experts will rejoice at the re-awakening. It is only by continuity of purpose, by upholding the good old cause of maritime discovery, in season and out of season, by watching and seizing upon every opportunity, that progress towards the end in view can be made. We know all the old worn out, oft refuted objections. We shall not tire in refuting them again and again, as occasion arises. And at the same time we shall accumulate new and stronger reasons for advocating Arctic research, as scientific knowledge advances. The geographical public should, meanwhile, avoid countenancing wild private schemes, remembering that when a private explorer is genuine, he is sure to have influential support. But when, in the fulness of time, a plan for discovery is advocated by our best authorities, with practical unanimity, then it should receive energetic help and encouragement from all true geographers — from all Englishmen who desire that maritime enterprise should be encouraged, and that our country should still retain her proud position in the van of polar exploration.

In conclusion I venture to hope that I have supplied an answer to those who ask—what are the uses of Arctic discovery? Those uses were admirably summed up by the late Lord Beaconsfield. They are the attainment of valuable scientific results by exploring the region round the pole, and the encouragement of that maritime enterprise which has ever distinguished the English people. The latter object must always be appreciated by all true Englishmen in all time, while the former object steadily increases in importance with the advance of knowledge.

On the Commercial Importance of Hudson's Bay, with remarks on recent Surveys and Investigations.—By Robert Bell, m.d. (*Vide ante*, p. 557.)

On the Island of Socotra.—By Professor J. Bayley Balfour.

Journey to the Imperial Mausolea East of Peking.—By F. S. A. Bourne.

Tuesday, September 6th.

Comparative Sketch of what was known of Africa in 1830, with what is known in 1881. By Lieutenant-Colonel J. A. Grant, c.b.—The author passed in review the progress of Exploration in Africa, taking the country in the order of Northern, Western, and Eastern, and commencing with an account of naval surveys round the coast. The standard map selected as illustrating the state of our knowledge at the commencement of the period was one published forty-seven years ago—on the 15th February, 1834—by Mr. J. Arrowsmith.

Speaking of Tripoli, he said: "Its chief importance to geography has been that travellers have made use of its seaports as a starting-point to Lake Chad and other places in the far interior. We thus know the existence and vast area of the Sahara desert. The travellers Oudney, Denham, and Clapperton having started in 1822 from here, their journey was followed up by the English Government sending an expedition in 1851 from Tripoli to Lake Chad for the purpose of establishing commerce between the coast and Chad. The party was commanded by Richardson, who was accompanied by two Germans, Drs. Barth and Overweg. They went a more westerly route than the previous travellers, and Petermann laid down the newly explored country in an admirably constructed map. In 1852, the Vice-Consul, C. H. Dickson, proceeded in a south-west direction from Tripoli, measuring his distances with a string for 300 miles. Murzuk and the lakes of Fezzan at 10° E. long. were explored in 1854 by the celebrated young astronomer Dr. Vogel." Describing next the state of our knowledge of Central Africa, as depicted on Arrowsmith's map, he said: "The Mountains of the Moon were drawn right across the continent from east to west between the sixth and tenth degrees of north latitude. The north-western and eastern halves of Africa were called, and correctly so, the Sahara and Libyan deserts. The sources of the Niger, Gaboon, Nile, Congo, Zambesi, Limpopo, and minor rivers were not known. Lakes Chad and Tsana were the only lakes marked in the maps of Africa, not a single lake appearing in Equatorial Africa.

"All information regarding the geography of both Niles was eagerly sought after about the commencement of the period under review. In 1830, the Viceroy of Egypt sent an exploring party which reached 10° south latitude, and during the following year, by the discoveries of M. Linant, no doubt was left in the minds of geographers that the White Nile had a larger body of water than the Blue Nile. In 1846, M. Lafargue, and M. Brun-Rollet, a Sardinian merchant, ascended the Nile, and came to the conclusion that it coincided with the river Niger, and drained the northern slopes of the Mountains of the Moon. In 1853, M. Werne reached the latitude of Gondokoro, and pronounced the White Nile to be the Nile of Egypt. After his expedition, the travellers M. Brun-Rollet, M. de Malsac, M. Miani, and others, proceeded up the Nile to 4½° N. lat., where they found the Nile to be a large navigable river, but they were unable to penetrate farther south in search of the sources.

"Abyssinia attracted considerable attention in the early part of the same period. In 1834, the Rev. Samuel Gobat published his narrative of a three years' residence. The zealous naturalist, Dr. Edward Rüppell, visited the now well known Aksum, Simeen, and the district of the river Tacazze, making valuable additions to a scientific knowledge of the country, its inhabitants, and animals. He received the Patron's Medal of the Royal Geographical Society for his researches in Nubia, Kordofan, Arabia, and Abyssinia. Shoa was explored by the worthy Dr. Krapf and his companion Isenberg, and a map produced from the observations made during three years' residence. A mission was sent to Shoa by the Government of India, under charge of Captain, afterwards Sir W. C. Harris, R.E., and a map of Abyssinia was executed 1843 from his observations. Dufé, a Frenchman, Baron de Wrede, Messrs. Ferret and Galinier, of the French Navy, M. Antoine D'Abbadie, with his brother Arnauld, and the German naturalist and botanist Dr. Schimper, lived for various periods in the country; M. Blondel, the Belgian Consul-General, who was released from prison through Egyptian influence, Dr. Beke, all gave their experiences of what they discovered in Abyssinia, so that when an English army marched into the country in 1868, all the principal routes were known, and our engineer officers were able to make an accurate survey.

"And yet so recently as 1845 Mr. Roderick I. Murchison, President of the Royal Geographical Society, said, 'Our knowledge of Africa advances slowly, thus upon the whole we have a most limited knowledge of Africa, and that little confined exclusively to the coast.' In 1846, Dr. Beke wrote that 'the position of the sources of the Nile remains as unknown as it was in the earliest ages.' And later, in 1851, Captain W. H. Smyth, R.N., as President of the R. G. S., in his address says, 'Though all beyond the coast of Central and Southern Africa is still a blank in our maps,' &c., and 'I must unhesitatingly express my conviction that *no European traveller from Bruce downwards has yet seen its* (*the Nile's*) *true source*.' Rear-Admiral F. W. Beechey, President R. G. S., wrote in 1856, 'The source of the Nile, yet undiscovered, lies mysteriously hidden in the vast unexplored region.'

"Looking at the map of Africa *now*, we find that the Mountains of the Moon have been swept away never to appear again; the sources of the Niger, the Nile, Congo, Zambesi, and Limpopo have all been determined; nearly a dozen lakes of magnitude are in their positions around the equatorial region of Africa. The mountain of Kilimanjaro, with its dome of snow, is found to rise to a height of 20,000 feet, and I may say the whole physical aspect of the continent is now tolerably well ascertained. An African map is no longer the blank it was fifty years ago—the great space north of the equator has been filled through the exertions of men of most nations, nearly one hundred of them; some rest where they fell, some came home to die, and a tenth of them survive. Lastly, the feat of cutting through 100 miles of desert and forming the Suez Canal has been accomplished.

"The Victoria Nyanza was discovered in the centre of Equatorial Africa on the 3rd of August, 1858, by Captain John Hanning Speke. This was an event of the first magnitude, and the discovery led to a supposition that this fresh-water lake, 3700 feet above the sea, and of unknown size, might prove to be the source of the Nile. Without loss of time the Victoria Nyanza was reached from England a second time, and its waters were traced down to Egypt by Captain Speke and myself, thereby settling the source of the Nile for all ages, reviving the maps of 1400, and fixing the parent-mother of the Nile in the Victoria Nyanza. However, there were many men of mark who disbelieved Speke's grand discovery; they divided his lake into three, they cut it out of the map of Africa, they placed the sources of the Nile in the lakes discovered by Livingstone in 9° S. lat., and speculated in every conceivable way with African geography; but it is satisfactory to think that since Mr. Stanley and a dozen other travellers have confirmed the geography of Speke, every mapper in the world adopts the delineation of the lake, of the new kingdoms of Karagweh, Uganda, and Unyoro, and the minor discoveries made by Captain Speke from 1858 to 1863, and that the public now know that the true Nile commences where it issues from Victoria Nyanza. The Victoria lake has its outlet at 10 miles north of the equator, and has only two *great* tributaries, the Kitangule, at its south-west end, and the Shimeeyu at its south-east corner. The former river is navigable for ships drawing from 9 to 12 feet of water for upwards of 50 miles from its mouth; it is fed by numerous lakes, the Akenyara or Alexandra, the Windermere, and others. The river Shimeeyu, as described by its discoverer, Mr. Stanley, has the most southerly source of any water falling into the Nile basin, but its volume of water is inferior to the Kitangule. In circumference the lake is equal to Lakes Huron and Erie, which measure 600 and 650 miles round. Another lake, the Luta-nzige (locust), 1000 feet lower in altitude, a back-water of the Nile, was placed in its present position by Speke from native information. Its name was changed to the Albert Lake by Sir Samuel Baker, who was the first explorer to visit it. It has been circumnavigated in iron boats by the lately deceased Romolo Gessi, and a steamer has actually been placed on its waters by Colonel Gordon. A survey of the Nile from Khartum to within 40 miles of Victoria Nyanza—500 miles—has been made by Lieutenants Watson and Chippendall, R.E., under Colonel Gordon's directions. The countries of Kordofan and Darfur are astronomically fixed by Major Prout, Egyptian Staff. Kordofan became a country of great interest to the public in the year 1850 from the charming narrative of Mr. Mansfield Parkyns, who resided amongst the Kubbabish (sheep) Arabs, hunting the ostrich with them from the back of a camel. The country lies in the line between Lake Chad and the Nile, with Darfur to its west, and the Bagara (cattle) Arabs to its south, and the Nile to the east."

After a summary sketch of what had been accomplished in the basin of the Niger, the author proceeded to notice the explorations made in the regions of the Gaboon and Congo. He said: "M. P. du Chaillu made several remarkable journeys in the countries of the Gaboon and the Ogowé. He travelled in an undiscovered country 3½° eastwards to the Ashangos, along the second degree of south latitude, in 1865, and made known to us the Fan warriors living 60 miles north of the line, the Bakalai country, the Ashira warriors, and the kingdom of Apingi, 30 miles south of the line, finding the gorilla in both districts, and travelling 8000 miles. Sir R. Murchison pays this traveller a high tribute in his Annual Address of 1861 for the journeys made by him in the years 1856–9 on the West Coast of Africa. Dr. Lenz (geologist to a German expedition up the Ogowé) explored Western Equatorial Africa from the year 1874, and returned to Hamburg in 1877 from the Ogowé and Gaboon. A cannibal race called the Osyeba, living up the Ogowé, was met with in 1874 by the late Marquis de Compiègne and M. Marche, and proved so hostile and powerful that the party returned to the coast. Lieutenant de Brazza, of the French Navy, with Dr. Ballay and M. Marche, also found this race a barrier to their progress, but last year success attended the French African Association expedition, under de Brazza. The commander ascended the Ogowé to its head-waters and beyond to the tributaries which supply the Congo, and in a second journey, M. de Brazza has done some good work; he has crossed from the basin of the Ogowé into that of the Congo, thence he descended to Mr. H. M. Stanley's station on the Congo, and returned by sea to his starting-point at the mouth of the Ogowé. . . . The Congo Basin covers an area equal to ten times the extent of Great Britain and Ireland; starting from its mouth, the basin touches the basin of the Ogowé, and the Uelle of Schweinfurth, in 4° N. lat., is supposed to be included in it. The waters of the Nile are close to the Congo basin along the west of the Albert and the Victoria Lakes, and at Unyanyembe, 400 miles from the east coast, the water flows into the Tanganyika Lake, one of the feeders of the Congo. Lastly, the series of lakes at 9° and 11° S. lat., discovered by Livingstone, and separated by ridges from the Zambesi system, all combine to form the Congo. This information has been gained since the year 1858, for we only knew the river from the travels of Captain Tuckey in 1816 as far as the Yellala Falls. In 1850, Ladislaus Magyar had travelled from Angola eastwards, discovering rivers flowing north, but did not trace them to the Congo system. Moorish traders made a successful journey across Africa from the west to the east coast. Starting from Angola on the 9th of June, 1853, accompanied as far as Katonga by a Portuguese named Antonio Francisco da Silva Porto, they arrived at the capital of the Portuguese province of Mozambique on the 12th November, 1854. Lake Tanganyika and its eastern tributaries were first discovered on the 14th February, 1858, by Burton and Speke, but they did not discover that this lake and its tributaries belonged to the Congo system. Lakes Bangweolo, Moero, the Lualaba, &c., were traced down their courses as far as Nyangwe in 4° S. lat., by Livingstone, who thought they might belong to the Nile system, but in this he was mistaken. Commander Cameron, who was the first to find the outlet to Lake Tanganyika, tried to proceed along the course of the great river which Livingstone left at Nyangwe, but had to follow a more southerly route to the West Coast, arriving at Benguela after crossing the continent from Zanzibar. All the discoveries made by these travellers added immensely to our knowledge of the interior, but to Mr. H. M. Stanley is solely due the honour of having followed these vast rivers and reservoirs to the west coast. He it is who has connected the waters of Bangweolo, Lualaba, and Tanganyika with the great river which flows past Nyangwe, for he surveyed this river in his English-built boat and on foot along its entire downward course to the mouth of the Congo, and named it after the great traveller Livingstone. It is very remarkable that the sources of the Congo and the Nile have been reached in a similar manner. They have been ascertained by travellers starting from Zanzibar, and tracing the waters of both rivers from the highest points of their basins, and following the streams to the sea, and not by following the course so long pursued, of ascending them. To the south of the mouth of the river Congo we have a coast-line of nearly 1000 miles belonging to Portugal. This consists of Angola (including Loanda and Benguela) and Mossamedes. Still farther south, in succession, we have Damara and Namaqua lands, embracing also nearly 1000 miles of sea-coast. These countries, in the maps of the present day, are well represented for 300 miles into the interior, and both Portuguese and English travellers have contributed to our knowledge by crossing the continent from east to west, west to east, and south to north. In 1836, Captain (now Sir James) Alexander, in travelling from the Cape to Walfisch Bay, made known the races of Namaqua, Damara, and Boshmen, and returned by a parallel route, collecting 320 specimens of animals and 125 species of birds. He made known 1500 miles of country which had never before appeared in any map. In 1852 Messrs. Francis Galton and Oswell, at their own expense, returned from discovering the countries between 22° 21′ and 17° 58′ S. lat. They were absent two years, travelled 1600 miles, and found certain parts in the interior to be 5000 to 8000 feet above the sea. Lake Ngami, 20° 20′ S. lat., was discovered by Livingstone, Oswell, and Murray in 1849, and the royal donation of 25*l.* was awarded by the Geographical Society to the Rev. David Livingstone for his enterprise in having been the first to discover and to lay down this lake. In 1853 and 1861 it was explored by Anderson and Baines, and a map published by Arrowsmith of Anderson's route between Walfisch Bay and Ngami. One of the most remarkable journeys ever made in Africa was that of Livingstone in 1853–4, who led a party of trading Makololo from their country to the seaport of Loanda and returned with them, thereby giving us a knowledge of two routes between the mouth of the Zambesi on the east coast and Loanda on the west. All journeys sink into insignificance when compared with the strides which this traveller made across Africa."

Reviewing next the progress of our knowledge of Southern Africa, Colonel Grant continued: "It only remains for me to complete this notice of what has been done in Africa during the past fifty years, by stating the progress made in that part which is north of the river Zambesi—I mean the territories of Mozambique, Zanzibar, Somali-land, Socotra, and Afar, to the east of Abyssinia. I believe I am quite correct in stating that, beyond the coast survey made in 1822–26, the knowledge we have from the voyage of Vasco de Gama, in 1497, and the accounts given by the Portuguese of their Madagascar possessions, we knew absolutely nothing of the interior; whereas in the present day, through surveys, explorations, and adventures, the whole coast and interior are well marked in our maps, and a rich region of coal, diamonds, and gold, has been opened up to commerce. The first time the island of Zanzibar is mentioned in the Journal of the Royal Geographical Society is in 1844, when a paper on Brava, Magadoxa, and Zanzibar, by Lieutenant W. Christopher, Indian Navy, was published. In the following year Mr. James Macqueen gave valuable notes on a visit made by Lief bin Said to some great African lake. If we read those notes, we are surprised at the accuracy of them, because the names of the places mentioned by the traveller, though they differ in spelling, can be traced with certainty. For instance, Boramy is Bomanie, Manmosies are Wanyamwesis, Mazeeamoo is Wazaramo, and, though Lake Tanganyika is not actually named, we are told that Lief bin Said proceeded to a great lake in a westerly direction, meeting with the river Magrazi, which we know as the Malagarazi. This shows to us that some reliance can be placed on information received from native travellers. In the same way, Mr. Rebmann, of the East African Mission, reported from Mombas in 1849 that a party in the interior had seen the mountains of Jagga, one of which, Kilimanjaro, was supposed to be 20,000 feet in height, with perpetual snow. This report led geographers to suppose that the sources of the Nile might spring from these snowy peaks south of the equator; but to the present day the mountains have not been thoroughly explored, and they are not supposed to contribute much water to the Nile system because of the reported dry nature of the country between them and the Victoria Nyanza. . . . Shortly after the year 1860, three expeditions started from Zanzibar, Speke's, Roscher's, and Von der Decken's. Dr. Roscher made a successful march to Lake Nyassa, but was unfortunately murdered on his return journey by natives of the Wahiao tribe. Baron von der Decken gallantly proceeded to recover his effects, but the natives were too hostile, and he returned to Zanzibar. Here he prepared for his expedition to the long famed Mount Kilimanjaro, and with Thornton discovered and ascended it to an elevation of 15,000 feet, judging the altitudes of the two peaks to be about 20,000 feet high. He received the Founder's Medal of the Royal Geographical Society in 1864 for his great publication on the two geographical surveys of this mountain, but in 1866 he was murdered while exploring in the region east of his first discoveries. His companion, the young and amiable Thornton, was also dead, but from causes brought about by fatigue. The limit of snow was reached in 1872 by the late Rev. Charles New, of the United Methodist Mission; but we are almost ignorant of the flora and fauna in the regions surrounding this mountain, and an expedition ought certainly to be sent there. Since the year 1863, a stream of explorers has poured into Africa from the East Coast, surveying its rivers—none of which are of any value for navigation, crossing the Coast range, ascending its mountains, collecting its flora and fauna, circumnavigating its lakes, establishing mission and postal stations, and giving accounts of their varied experiences to the world; but the country is so vast that we may say that Eastern Africa remains in its infancy still, and explorers like young Thomson, of our last Expedition to the Lakes—a score of such—will be required before the field is exhausted."

Some Results of Fifty Years' Exploration in Africa. By the Rev. Horace Waller.—The author premised that we were at the present time conscious of the dawn of a second and higher stage of geographical enterprise connected with Africa, and that there was a tendency to turn the recent discoveries to their legitimate purpose—the removal of the barbarism and misery which afflicted this great continent. Fifty years ago the word "Africa" lay almost like a dead weight on the national conscience, a weight removed once and for all when, in the third year of the British Association's existence, the Emancipation Act severed all English connection with slavery. At this time geographical interest chiefly centered in the countries lying between the western fringe of the Sahara and the Atlantic, and the Niger absorbed most of the enthusiasm which had been aroused by Denham and Clapperton.—Briefly noticing the succession of travellers who, in the interval between 1830 and 1881, had added to our knowledge of the various regions of the West Coast, the author passed to Central Africa and the Lake Region. He said, "many will doubtless remember the feelings with which Livingstone's simple narrative of his travels across Africa in the years 1851–4 was received. Men interested in all branches of science, in company with the geographer and the philanthropist, were quick to see in the wandering missionary qualifications which each, from his own point of view, was able to draw upon. No man ever had his eyes about him so much as he; no traveller ever delineated so scrupulously what he saw; it may be doubted whether any single individual ever rendered such faithful service to Africa, or gave such an impetus to geography. To David Livingstone were granted moments rare indeed in the history of mankind. Who can imagine what it must have been to look upon the Victoria Falls of the Zambesi and upon the Moero and Bangweolo lakes for the first time? His earlier explorations will always be associated with his heroic determination to save the Makololo tribe from becoming decimated by the slave-trade, which at the time of his first visit to them, in 1850, had just been opened in their midst by slavers who came from Zanzibar. Grasping the whole situation in a moment, he sought to find for the central tribes an outlet for their ivory and other produce, either on the western or eastern side of the continent, nay on both, crossing the continent on foot and tracking the greater part of the Zambesi throughout its length. As a result he found the river true to the character of African rivers in general, and only navigable up to the cataracts above Tette. Far more important, however, in his eyes were the revelations which his experiences authorised him to make on his return to England. Everywhere he had found nations and tribes willing to befriend him, mendicant as he was of necessity, in their towns and villages; but there were everywhere the unmistakable footprints of the slave trader, and it became henceforth the ruling passion of his life to be beforehand with the deadly foe of the peoples amongst whom he hoped to spend his days. With this in hand as the key to his exertions, we can well understand with what joy he availed himself of the proffered help of H.M. Government, and accepted the leadership of the Zambesi Expedition of 1859 in which we find the names of Charles Livingstone, Kirk, Baines, Thornton, and E. D. Young associated with his own. Armed with Consular authority, he unflinchingly exposed the French engagée system, one of the worst forms of slavery. He brought to light all the ramifications of a traffic in slaves between the Shiré Highlands and the trans-Zambesi Kafir tribes, carried out with the most unblushing effrontery by the Portuguese in East Africa. This was causing the destruction of hundreds of thousands, whilst at the same time it was not even suspected by the outer world. Looking back upon those years of bitter disappointment, on so-called wasted lives, on unsuccessful experiments in river and lake navigation, we can nevertheless see now how valuable to Africa was every exertion made, every experience gained, every example of single-minded devotion and sacrifice displayed before the natives. . . . If Africa was to be opened at all it was requisite to find out in the first place the weak places in the expedition work, that they might be avoided in time to come, and to note for the use of explorers and missionaries, what must be done and what avoided. No mean items these following canons of the Zambesi and Shiré:—First, that no man, to be efficient, should content himself with a residence at a lower level than 3000 feet; that the mosquito curtain is valuable against miasma; that unnecessary exposure to wet means death before long; that quinine may be sorely abused as well as used;—these and many other conclusions of the same order have become simply invaluable. . . . The Zambesi Expedition was eventually withdrawn in 1863. The *Pioneer* was found unsuitable for the Zambesi navigation, and the venture in which Livingstone had sunk nearly the whole of his personal property, viz. the building of an iron steamer in sections to be placed on Lake Nyassa, was a disappointment without one redeeming feature at the time."—Turning next to the great lakes the author proceeded:—"Rudely delineated in ancient maps was a certain inland sea with various names attached to it, somewhere in the direction of the Tanganyika of to-day. The Mombas missionaries (upon whose roll-call we find the discoverers of Kilimanjaro and Kenia in such names as Rebmann, Krapf, and Erhardt) had diligently sifted the reports of Arab traders trafficking with the distant tribes, and to them the existence of this lake was anything but a myth. Under the auspices of the Royal Geographical Society, Captains Burton and Speke started from Zanzibar, in 1857, to solve the problem. Keen sportsmen, trained in India, and already aware of the peculiar difficulties of African travel from their previous expedition to Harar, furnished with that technical knowledge of mapping out a route (the absence of which we often have to deplore bitterly in so many travellers), they were rewarded by the discovery of Lake Tanganyika, and brought back with them a store of information connected with the whole country traversed, which has been of the greatest use to all subsequent travellers and missionaries. But one piece of news on the testimony of Captain Speke far outshone the rest. He asserted that yet another very large lake lay to the north-east of Tanganyika, and that the true source of the Nile would probably be found there. Few who recollect the intense delight with which Sir Roderick Murchison welcomed all new discovery in Africa, will forget how he instantly seized upon the material brought to him by Captain Speke, nor how he urged him to develop without delay the gigantic project which was already half formed in the young officer's mind. No more important duty lay before the Royal Geographical Society than to aid this fresh venture to the full, and the way in which it was carried out must always redound to the credit of all concerned. To Speke and his companion Grant fell the honour of setting at rest beyond all cavil the puzzle of every age. They viewed the waters of the lake away down the Ripon Falls, they tracked it to within a few miles of Lake Albert Nyassa, the presence of which to their westward they were able to indicate to Sir Samuel Baker, who opportunely arrived to relieve them, and again taking up the Nile's course, they traced it down to Egypt proper. Thus having accomplished the 'Walk across Africa' of our bookshelves, they returned home to receive the well-merited congratulation of the whole civilised world. . . . Very welcome as an accession to our knowledge of these countries was the elaborate account given to us by that accomplished naturalist, Dr. Schweinfurth, who passed through the complicated network of tributaries which reach the White Nile west of Gondokoro. In 1869 to 1871 he carefully examined the watershed which on the one side supplies the Nile, and from the other casts waters in the direction of Lake Chad. Great interest centres around this discovery. Schweinfurth came upon the river Uelle in April 1870, when its flood was at the lowest. Nevertheless he found a river 800 feet wide, from 12 to 15 feet deep, passing westward with steady flow, and at that point approximately 1000 miles from Lake Chad. He had no reason to doubt the testimony of those he questioned, who one and all declared its course to them was known in a northerly direction for many days. Here then is a problem yet to be solved of the most interesting kind. Surmise of course would track it to Lake Chad, but surmise has already spoilt too many maps of Africa to allow of our doing more than recommending the thorough exploration of the Uelle to those who would wish to win geographical laurels. . . . With regard to discoveries made from the East Coast," the author continued, "we see the inauguration of a new chapter of research, which for the time seems of the very first order. It is necessary here to go back to the days of Livingstone's recall from the Shiré in 1863, for a moment, to pick up an incident of some value. Whilst waiting for sufficient water in the rivers to enable him to bring down his two steamers to the sea, there was just sufficient time to make a journey into the hill country of the Wabisa, west of Lake Nyassa. It was a hazardous venture in some respects: he rose from sickness, literally from death's door, to accomplish it. But its bearing upon his after exertions was all-important. Livingstone heard quite enough from the Wabisa to make him believe that a great lake lay away due westward of him. He was not the man to let an impression of this kind subside, and on his return to England he planned, in council with Sir Roderick Murchison, his last great expedition. . . . Livingstone quitted England for the last time in the autumn of 1866, and having visited Bombay, repaired to Zanzibar to make final arrangements for his journey. We find him making for the Rovuma river once more. . . . Travelling round the south end of Nyassa, he now ascended to the high plateau which forms the watershed between the Loangwa and the Zambesi. He made the southern end of Lake Tanganyika, and then striking the higher waters of the Chambezi, traced this river to Lake Bemba or Bangweolo, thus verifying the native report of 1863. . . . Livingstone's discovery of Lake Bangweolo was followed by an arduous journey to the westward of all points previously known. He found in the great flood of one, Luapula, pouring out at the west of the lake, a possible Nile or Congo. . . . Eagerly did he visit Lake Moero in November 1867, and traced the same river thence under the name of Lualaba, flowing in a northerly direction. The natives assured him that several other lakes were strung together by a great river coming from the westward. But here his strength failed him so seriously that he was forced to make for the Arab settlement at Ujiji. A bitter disappointment met him when, exhausted in mind and body, he discovered that only a very small portion of the stores he had ordered from the coast had survived a general pillage made on the journey up. . . . How Livingstone was for the time lost, then found by Mr. Stanley, and succoured in great straits, is well known to all . . . . Still uncertain whether he had been working out the line of the Nile or Congo, there came with better strength the old unconquerable craving for thorough satisfaction, and he started southward after parting with Mr. Stanley at Unyanyembe, to make a wider cast, and trace the Lualaba on past Nyangwe. Few could doubt that he went this time to certain death! The intense excitement connected with the discoveries on his last journey, and the conviction that he would probably not be able to visit Africa again, furnished the stimulus which drove him onwards; but indications were not wanting to show that the exhaustion consequent upon disorders contracted whilst travelling amongst the swamps of Africa for so long had overbalanced all chance of success. We know that his heart lies buried by the shores of Bangweolo, laid there by his men when they bore his body home. Was there ever a more interesting heart-burial than this? Did Crusaders in olden times do greater honour to any leader than Chuma and his companions to the man who had fallen in this assault on darkness and cruelty? . . . But now sufficient knowledge had been acquired to open up problems of the most exciting nature. In January 1873 Lieutenant Cameron, who had been armed with ample material by the Royal Geographical Society, and had met the body of Livingstone being borne to the coast, dashed single handed into the country to solve them. After a survey of the shores of Lake Tanganyika, he made his way quickly to Nyangwe, but found himself baffled in his project of descending the Lualaba. Then began an independent journey over totally new ground by Kibokwé and Bihé to the West Coast. . . . But still geographers felt that the interest connected with the Lualaba had only increased instead of being diminished. All that Livingstone had seen and heard of the gathering into one northerly torrent of lake-waters, rivers and streams without end, was more than borne out by Cameron's recital. The desert of old maps proved to be the most drenching part of the earth's surface! Levels, to say nothing of the volume of water, put all idea of the Nile being the ultimate destination of this northerly flood out of the question. It wás left for Mr. Stanley to trace the Lualaba into the Congo and the Congo to the Atlantic Ocean. The history of the venture, which must always stand out in bold relief from modern journeys of discovery, is familiar to all. Later work of great value has been done on the lakes Nyassa and Tanganyika by the members of the Scotch Livingstone Mission, especially by Mr. James Stewart, C.E., and by Mr. James Thomson. It cannot be long before an effort is made to explore the country behind the Somâli coast. It is true that to Rebmann, to Krapf, to Wakefield, and especially to Mr. New (a man whose early death deprived us of a store of *élan* and research seldom found in any individual), we are greatly indebted for what we know of a country supremely difficult to traverse. That earthquakes prevail and have prevailed in great intensity near Lake Nyassa there is reliable native evidence to show. Hildebrandt, visiting Oerteali in 1875, describes the thick smoke clouds rolling away from its summit; Wakefield states that between Mount Kenia and Victoria Nyanza in the Njemsi land 30 or 40 craters were reported to be constantly giving off smoke. It would seem extremely probable that amongst the physical wonders of Africa we shall yet have many brought home to us in the near time to come respecting this volcanic action."

In his concluding remarks Mr. Waller said:—

"Too briefly have we touched then upon the main explorations which have opened out Africa since the foundation of the British Association. Africa has for centuries been surrounded by a ring of fire. Like the poor insect which, with the glowing embers round it, fails to find a gap here or there, and at last retreats into the midst to destroy itself with its own sting, so the tropical regions have been fenced in by the slave trade round the coast. The tribes in Central Africa, unable to reach out to civilisation, have preyed upon themselves. The poison of the slave trade has been turned in upon the inhabitants of the glorious highlands and the borderers of the lakes. They have seen it hopeless to attempt to bring the products of their own magnificent land to the sea; it is a bourne, in the mind of the native, from which no traveller returns. Thus hemmed in they are content to have goods of the western and eastern world brought to them by the Portuguese, the Egyptian or the Zanzibar Arab, by the Sebehrs of Gordon, the Tipoo-tipoos of Cameron, the Marianos of Livingstone! These tear their children from them as the slaver only knows how to take them, and then we wonder that Africa has been shut up so long! . . . I cannot help fixing your attention upon the water way into Central Africa which we have indicated in the course of the Zambesi and Shiré and the Lake Nyassa —here is the water that will quench the glow of the old fire and enable Africa to pass over and tell us what her inner treasures are. . . . On the Congo we watch with anxiety the efforts of Mr. Stanley to turn his prodigious discovery to account under the King of the Belgians' auspices. France opens the purse-strings of the Republic to enable the Count de Brazza to settle and civilise her possessions on the Ogowé river. Who will, who can divorce these happy facts from the explorations of the last fifty years? Africa is changing: her natural wealth will help the process. She divulges spots which for intrinsic worth make all others on the earth's surface insignificant: who can say what an acre of land at Kimberley will yield in wealth from first to last? Attracted to diamond fields and gold fields, many of the explorers of the future will learn, as Dr. Holub learnt, to take more than a passing or a selfish interest in her. The time will assuredly come when the high plateau will be traversed hither and thither by others than slave traders, and colonists wonder how it came about that Central Africa was so long left to itself. The swift river passage, the ascent to the 3000 feet level, these are the two essentials. The first article as an importation which Africa craves for is one which perhaps we can least spare, without it she pleads that neither missionary nor explorer can woo her long enough to love her well: I mean a stock of common sense. Whenever the good time has fairly come, then men will stand amazed to think how the forerunners were content to perish in sickly swamps near the coast, and the time will have gone for men to stand up to their necks in miasmatous mud to shoot hippopotami. If in the early days of India it was said that it was a country in which the "griff" might take liberties with any thing except himself, of Africa it may be said that the liberties men are apt to take with themselves have been disastrously against her welfare, and have reduced our knowledge of her almost to a minimum. If we have already steamers plying on both sections of this route, and others about to be sent out to navigate Tanganyika, we recognise the best evidence of progress. It is not my intention to parade missionary efforts before you here, but it would be a clumsy concealment if I ignored the fact that missionary work has mightily altered the geographer's task for the better over the whole district between the coast on the east and the lakes as a western boundary. Portugal has permanently removed, we may trust, barriers and restrictions of late which will assuredly be repaid to her a hundredfold, although temporary embarrassments have resulted at home, which we may trust are already fading away in the light of national *amour propre.* Much of this is due to one whom we shall now miss from amongst us, the late Vicomte Duprat, one to whom all missionaries and travellers passing into the Portuguese possessions in East Africa have owed so much."

Recent Visit to the Gold Mines of the West Coast of Africa.—By Commander V. L. Cameron, R.N.

Account of recent Visits to Dahomey.—By the Rev. J. Milum.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Du Chaillu, Paul B.—The Land of the Midnight Sun: Summer and Winter Journeys through Sweden, Norway, Lapland, and Northern Finland. With descriptions of the inner life of the people, their manners and customs, the primitive antiquities, &c. London (John Murray): 1881, 2 vols. 8vo., pp. xvi., 441 and 474, map in cover, 235 illustrations. Price 1*l.* 16*s.*

The result of a series of journeys made at different times, and both in summer and winter, from 1871 to 1878, covering a stay of nearly five years in the country. The author's routes were irregular, often crossing each other, and at different seasons of the year, either from the Baltic to the Polar Sea, or from east to west. He has observed the whole coast from Haparanda to the extreme north-eastern point of Norway, a distance of 3200 miles, and has sailed on almost every fjord. Mr. Du Chaillu's chief object seems to have been the acquisition of a thorough acquaintance with the physical characteristics of the country, and perhaps even still more with the manners and customs of its inhabitants, especially of the rural population. With that idea, he acquired some knowledge of their languages, and his descriptions of home-life and primitive customs are taken entirely from his own observations. On scientific points he has consulted the highest local authorities, availing himself of the most recent researches of the Norwegian and Swedish archæologists in his treatment of subjects bearing on prehistoric and Viking ages.

The very numerous and excellent illustrations are mostly from photographs taken expressly for this work; some of them, representing winter scenes in Lapland, are, however, by a well-known Swedish artist. The map (55 miles to the inch) shows railways and roads in the whole Scandinavian peninsula, and gives the author's routes within the Arctic circle. Of these, perhaps the most interesting is his ascent of the Torne river from Torneå to the junction with the Muonio, which he followed along the frontier of Russian Finland to Palojensa, a hamlet at the mouth of the Palojoki affluent, running nearly due north across Russian territory. This little stream, much broken up by rapids, flows from Lake Palojärvi, on the slope of the plateau forming the southern watershed, about 1100 feet above the sea. Crossing the lake, and following another small river, the Rastajoki, on its northern side, another small lake was reached, called Givijärvi, forming the boundary with Norway. Thence the author travelled overland to Kautokeino, which is on the northern side of the watershed, towards the Arctic Sea. From that point the head of the Alten fjord was reached, and on another occasion an eastern route was followed past Karasjok, on the Russian frontier, to the head of the Waranger fjord.

The habits of the Lapps are especially described; and the book contains much scattered material of interest on the distribution of plants, glacial action, conspicuous instances of upheaval or sinking, water system, animal life, &c., in Norway and Sweden, in addition to its antiquarian and domestic aspects.

ASIA.

Raverty, Major H. G.—Notes on Afghánistán and part of Balúchistán, geographical, ethnographical, and historical, extracted from the writings of little-known Afghán and Tájzík historians, geographers, and genealogists; the histories of the Ghúrís, the Turk sovereigns of the Dihlí kingdom, the Mughal sovereigns of the house of Tímúr, and other Muhammadan Chronicles; and from personal observations. Printed by order of the Secretary of State for India in Council. London (Eyre & Spottiswoode): 1881, fo. [4150. I. 1274], pp. i.–vii., 99–316.

This third section of the important treatise, of which the first two sections were noticed in the last volume of our 'Proceedings,' p. 708, contains an account of the various routes leading from the city of Kábul into the countries and districts north of the river of Kábul, as far as Badakhshán and Káshghar, with a brief description of them and their inhabitants.

It is impossible here to give even the headings of the routes, of which 61 are enumerated in this section, often with alternative and subsidiary roads and passes, and accompanied in the majority of instances by historical, geographical, and ethnological descriptions, elucidated by copious critical notes. Among the many subjects of interest treated, are the Tor and Spín Káfirís or Sí‘áh and Safed-Poshán and their country, Káfiristán generally, Káshḳár and its dependent Dara'hs, the various routes to and from Chitrál and Gilgit, the Yúsufzí, Mandar, Dá'udzi, and seven other tribes of Afghans, and the routes from Láhor to Yár-ḳand. Attention may be called in the description of the latter to some observations (p. 295) on the divergencies of opinion respecting the physical aspect of the Pá-Mír and the meaning of that compound word; also to Major Raverty's remarks on the definitions of Great and Little Tibet (p. 295), "Bolor" (p. 298), and the non-existent "Bam-i-Dunya" or "Roof of the World" (p. 157). In referring to the 26th route, from Harandú to Apá-luk, up the Dara'h of Luṭ-Dih, Major Raverty points out (p. 149) the great importance of the Kotal or Pass of Apá-luk, leading into Badakhshán. This he says has never yet been mentioned by any other writer than the native author whom he quotes; it is but 96 miles in a straight line from Jalál-ábád, 88 from Pashat, 125 from our frontier fort of Abá-zí, and less than 150 from Pes‘háwar. It is believed to be as practicable as the majority of the passes over the Hindú-Koh range; and an enemy in possession of Badakhshán, desiring to reach Pes'háwar or Jalál-ábád, would save a vast distance by adopting it instead of the passes leading to Kábul, and would also be able to command the other passes further east, leading into Káshkár.

It is difficult, however, to emphasise any particular portion of this work, which abounds in topographical and historical matter of political as well as geographical value.

Scott-Stevenson [Mrs.].—Our Ride through Asia Minor. London (Chapman & Hall): 1881, 8vo., pp. 400, map. Price 18*s*.

The authoress accompanied her husband, Captain Andrew Scott-Stevenson, Civil Commissioner of Kyrenia, Cyprus, on a riding excursion in southern and eastern Asia Minor, mainly in the Cilician and Karamanian regions visited by the Rev. J. E. Davis, and described in his 'Life in Asiatic Turkey,' 1879, but with considerable deviations to the east and north. Crossing from Larnaka to Beyrout, Mrs. Scott-Stevenson went by steamer to Alexandretta, following the usual route to Aleppo (to the present condition of which city a chapter is devoted): she then struck northwards by Killis to Aintab (Antiochia ad Taurum) and the Jeihan, reaching Adana and Tarsus, and striking north to Kaisariyeh. Thence, after visiting Nem Shehr to the west, she turned south and south-west to Eregli, and reached Koniah by the Karaja Dagh, returning to the coast at Chelindreh, in Itchili, by Karaman and the Calycadnus, and landing on Cyprus eastward of Kyrenia. The country appears to be changed considerably since the period of Davis's visit. Mrs. Scott-Stevenson is very decided in her strictures upon the craftiness and parsimony of the Armenians at Kaisariyeh, and fully endorses the statements as to the injuries done to the peaceable inhabitants by the Circassians transferred to Armenia by the Russian authorities. The village of Kütschü-Keuy is stated to be north-west of Ismil, instead of south-west, as placed in Kiepert's map of Asia Minor, which is stated to be practically useless. The map to the work is specially drawn by Lieutenant Kitchener, R.E. (scale, 35 miles to the inch).

Walker, J. T. (Major-Gen.).—General Report on the Operations of the Survey of India, comprising the Great Trigonometrical, the Topographical, and the Revenue Surveys under the Government of India, during 1879–80. Prepared under the superintendence of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., Surveyor-General of India. Calcutta (Office of the Superintendent of Government Printing): 1881, fo., pp. 1–65, (1–83), and 1–5. Maps.

The local operations of the Triangulation in the Madras Coast, Eastern Sind, and Siam Eastern Frontier Series and in Burma, and of the Topographical, Village, and Field Surveys in various parts of India are detailed, resulting in no special features. In Darjeeling, much useful work has been effected, by the adjustment of boundaries and surveys of lands immediately important on account of their economic value for tea and chinchona plantations, although the leader of the party, Lieut. Harman, was disabled from frost-bite on the Thibetan frontier. In Sikkim, the same officer surveyed over 1000 square miles on the scale of ¼ inch to the mile, spending 3½ months in the country east of the range running south-east from Kanchinjinga. He ascended the Lachung and Lasing valleys to the boundary line at the Donkia and Kangra Lama passes; and also reached the summits of Kinyong, Nochego, and other mountains, penetrating into parts never before visited by a European, and determining the heights of about 300 positions of more or less importance by barometric and boiling-point observations. To the west of the range above mentioned, Mr. Robert succeeded in making a survey on the ½-inch scale of an area of some 600 square miles, including the Nepal boundary line. From the numerous commanding points on this mountain frontier he could see most of that part of Nepal which lies to the east of the southern spurs of Mount Everest, and was able to sketch an area of about 900 square miles, besides fixing a large number of points on the surrounding hill ranges and in Sikkim. His work is found to combine well with that of Sir Joseph Hooker.

The geographical operations in Northern Afghanistan, adding so much to our topographical knowledge of that country, have already practically been made known in our 'Proceedings'; some additional geography was however obtained in Southern Afghanistan, between Kandahar and Girishk, and along the valleys to the west and north-west of Kandahar. A connection with the operations in Northern Afghanistan was also made by the survey of the route from Kandahar to Ghazni, through the Khush-i-rud, Tarnak, and Ghazni Valleys. The notes by Captain Holdich, as usual, abound with information; he figures the Minar Chakri tower, near Kanzada Kila, and gives a sketch map of the Logar Valley, to show its position, &c.

In Beluchistan a rough reconnaissance was made of a considerable portion of the country north of Sibi inhabited by the Marri tribes, and detailed surveys were commenced in the plains around Sibi and Dadur.

Passing over the more technical portions of this Report, the Trans-frontier explorations are naturally of considerable geographical interest. The work by Colonel Tanner around Gilgit can only be considered as preliminary, but, with the aid of a native surveyor, he has extended the limits of the map as far south-east as Astor, northwards to the great range which separates little Guhjal from Gilgit, southwards to Chilas, and westwards to the mouth of the Wurshigum river at the entrance of the Yasin Valley. Several of the spurs which run down from the range west of the Khagan Valley to the Indus have been fixed, as have the positions of many far distant peaks on the Hindu-Kush range, including Tirich-Mir, north of Chitral, over 24,000 feet high. Colonel Tanner found that the only guide in estimating the distances of remote snow-peaks was their colour, far off snow having always a slightly pink tinge. The rounded forms of some high snow-capped mountains were found to be due to the constant piling of snow on them when their summits were not too sharp, the apparent height being thus sometimes increased by hundreds of feet. He saw the powdered snow flying in clouds off the upper slopes of Nangaparbat, even after two clear days, in which the rays of the sun would be very powerful in the highly rarefied atmosphere, and he doubts if snow ever melts at that altitude. This mountain and some others are too sharp to allow the snow to lie in any quantity; it almost immediately descends to a lower altitude in the form of avalanches, and then gradually hardens into glacier ice.

A very marked feature in the great flattened range between the Indus and Gilgit rivers was the extraordinary number of mountain-lakes or tarns, which were found as many as three or four together at the sources of all the small feeders. Colonel Tanner observed one of these in course of formation, during his week's encampment at the head of a high valley. Opposite his tent was a small glacier with one crevasse only, and a small moraine, and this was discharging stones night and day into the ravine, damming it up. It had already formed a broad and extensive marsh, which at some future time would become a deep sea-green lake like the rest. The uppermost of these tarns, which even in August were covered with little icebergs, had been made by the scooping action of ice, but the others were pent up by the moraines of small side glaciers, which owing to climatic changes no longer existed. Besides other interesting notes upon great tracts of shattered volcanic rocks, and on his success in obtaining a near view of the northern slopes of Nangaparbat and its glacier valleys, embracing a slope of nearly 24,000 feet, from a stupendous precipice 16,000 feet high, rising sheer and unbroken from the forests of Gor, Colonel Tanner records the distribution of vegetation in Gilgit, with details as to the more important species. The upper limit is pretty constant at 16,200 feet; and many wild fruits are found.

A further subject of great interest is afforded by the details of the exploration of the upper course of the Irrawaddy, beyond Bamo, by a native of Burma trained by Captain J. E. Sandeman, Deputy Superintendent, and given in the Appendix in the form of extracts from a Report by that officer, accompanied by a translation of the explorer's notes. The native started from Bamo with two companions, and provided with sextant, compass, boiling-point thermometers, &c., in November 1879, and was absent less than six months: Captain Sandeman observes that though he did not visit the exact source of the river, he was not very far from it, and has done much to silence conjecture for the future. He ascended the river in boats, first to the village of Haw-ka in lat. 25° 6′, and then to Ka-cho, once an important city, in lat. 25° 20′, at an elevation of about

1000 feet. Thence he proceeded by land, pacing distances and taking bearings, to Mo-goung-poon Maing-koung, in lat. 26° 8′, at which place the exploration terminated.

At the village of Maigna, about 16 miles north of Ka-cho, the Burmese frontier was reached. The country beyond is inhabited by Kachins or Kansa-Kachins, among whom no Shans reside, and the people pay no tribute to Burma. Two days afterwards, the village of Pouk-san-poon was reached, whence a view was obtained of the junction of the eastern and western branches of the Irrawaddy, about 5 miles to the north-west. The western branch, called the Malee-ka, had previously been noticed to be considerably swollen, and about 500 paces wide; while the eastern branch, called Mek-ka, at which the party arrived, was low, flowing with a stream only 100 paces wide down rapids and over large rocks. The people of the country stated that the great increase of the waters of the Malee-ka or western branch was due to the melting of the snow at its sources, and there can be little doubt that this is the larger of the two and rises in higher ranges. According to native report, the eastern branch has two principal affluents, one rising in the hills to the north, six days' journey (of 8 or 10 miles each) from Mo-goung-poon, and peopled by Maroos; the other flowing from the east, and originating in a large lake called "Noungsa," in Chinese territory, apparently on an elevated plain, and well peopled with Shans and Kachins. The eastern branch is termed "In-myit," meaning "Lake river," by the Saya; the Shans call it "Myit-ngeh" or "Little river," and the western branch "Myit-gyee" or "Big river." At Kacho, the explorer heard that it was from twenty-two to twenty-four and at Mo-goung-poon from eight to ten days' journey to Kantee, near the sources of the western branch. At Mo-goung-poon Maing-koung, the two branches were stated to be but one day's journey apart to the north. The eastern branch was not affected by the first melting of the snows that flooded the western one, but was daily drying up; and the gauge register of the Irrawaddy, officially kept down the river at Myanoung, corroborates the rising in lat. 25° 30′ recorded by the explorer at the end of February.

The Malee-ka or western branch is therefore obviously the main one (though it is possible that the rise of the Moungsa Lake during heavy rains may account for the enormous rise of the Irrawaddy), and it is highly probable that it is the river reached by Wilcox in his journey from Assam in 1827, his "Khanti" being apparently the same as the explorer's "Kantee." Any probability of its being the Sanpo, as suggested by D'Anville and recently argued on hydrological grounds by Mr. R. Gordon, is at all events now to be abandoned.

The explorer's translated notes show a remarkable degree of intelligent observation, and contain very interesting and elaborate details concerning the different races of people among whom he travelled, especially as to domestic habits, religions, customs, &c.; and this part of the Report is well illustrated by a map of "Some Sources of the river Irrawaddy, above Bamo," which shows the explorer's routes and information nearly up to 27° N. lat., supplemented as to the more northern portion by Wilcox's map, 1828, and by an inset taken from the map of the eastern frontier of Thibet by the Abbé Desgodins. The information from these three different sources is fairly accordant, but a combination of the two maps of Wilcox and Sandeman is not possible until the unknown course of the western branch, between the Moong-Khanti of the former and the explorer's junction of the Malee-ka and Mek-ka is effected. A new position is assigned to Bamo, about 4 miles to the west of that employed by Colonel Yule, and 10 miles to the west of that assigned to it by Wilcox; this is based on repeated recent astronomical observations by Captain Bowers of the Yunan Expedition.

AFRICA.

Bizerta und seine Zukunft.—Prag (Mercy): 1881, 16mo., pp. 48, map, illustrations.

An opportune and excellently illustrated account of the history and present condition of Bizerta, with its canal, lakes, and harbour, from the pen and pencil of our recently elected Honorary Member, H.I.H. the Archduke Ludwig

Salvator of Austria, to whose talents our Library is already so largely indebted. The engravings represent Bizerta from the sea, Cape Bianco, Cape Zebib, Bab Rassas, the canal, bridge, and island, Hasba gate, Hofra, minaret of the Kebira mosque, bazaar, and fort of Sidi Suleiman. A small scale sketch map, supplied by the Chevalier Ernst von Hesse-Wartegg, is also given. This detailed description forms a useful supplement to the general geographical paper by Admiral Spratt in vol. xvi. of our Journal, p. 251, which is accompanied by a map on a much larger scale.

Rohlfs, Gerhard.—Kufra. Reise von Tripolis nach der Oase Kufra, ausgeführt im Auftrage der Afrikanischen Gesellschaft in Deutschland. Nebst Beiträgen von P. Ascherson, J. Hann, F. Karsch, W. Peters, A. Stecker. Leipzig (Brockhaus): 1881, 8vo., pp. 560, maps, tables, and illustrations. (*Williams & Norgate:* price 16*s.*)

Dr. Rohlfs, in the first part of this work, describes the incidents of the journey undertaken by himself and Dr. Stecker (who accompanied him as scientific observer) at the expense of the German African Society, commencing in the early winter of 1878, and brought to a conclusion in the October following. The different stages of this expedition have been from time to time reported in our 'Proceedings' for 1879. Starting from Tripoli, Dr. Rohlfs travelled south-east and south to Sokna in the Jofra oasis (from which various smaller excursions were made), thence continuing in a south-easterly direction to the small oases of Sella and Moja. From the latter, he struck north-east to the Abu Naim oasis, reaching Aujila and Jalo, nearly due east, in the beginning of April. These two last-named oases are approximately at sea-level (p. 226).

A visit was then made to Bengasi, on the eastern side of the Gulf of Sidra, and after about a month's stay there the party again turned south through Aujila and across the Libyan desert to the Kufra oases, where a stay of a month was made at Kebabo, the final return to the coast being again made at Bengasi. At Kufra, the party was attacked and plundered by fanatics; but it is satisfactory to find that the Turkish Government recognised their liability in this matter, and has transmitted 800*l.* to the German African Society towards their loss.

This book is an important addition to the literature of North African geography, containing (besides much material of interest upon topographical, zoological, and historical matters in the text), a second part exclusively devoted to scientific work. This comprises: i. New routes explored by Rohlfs in Tripolitania (Sokna to Fuga, Sella to Sirt or Syrt and Budrita, on the Mediterranean; Sella to Wau-el-Namus, Wau-el-Kebir, and Temissa; Temissa to Aujila; Bengasi to Derna, Tobruk, and Jarabub; Derna to Jarabub and Aujila); ii. Temperatures of springs in Tripolitania and the Sahara, by Rohlfs and Stecker; iii. Elevations by aneroids, and iv. Results of meteorological observations, by Dr. J. Hann; v. The Amphibians found during the expedition, by Professor W. Peters (22 species, including one new genus, Tropiocolotes); vi. The Articulata, by Dr. F. Karsch; vii. The plants of Central North Africa made known by the expedition, by Professor P. Ascherson (a most complete and erudite work); and viii. Tables of meteorological observations, by Rohlfs and Stecker.

The maps are, 1, of the Oasis group of Kufra (scale 1:2,000,000); 2, of the Jofra oasis (scale 1:200,000); and 3, of the whole region in Central North Africa (scale 1:4,000,000), with special inset of the routes from Sokna to Jalo (scale 1:2,000,000). The general map shows the former routes of Rohlfs and other travellers. There are seven full-page illustrations and some few woodcuts, representing the most important scenes and objects.

GENERAL.

Kuntze, Otto.—Um die Erde. Reiseberichte eines Naturforschers. Leipzig (Frohberg): 1881, 8vo., pp. 514. (*Dulau:* price 6*s.*)

The author, well known for his writings on Chinchona, describes his experiences, economical and botanical, during a journey round the world, dismissing or briefly discussing the United States, Japan, and Egypt, as already sufficiently written about. No route, map, contents, or chapter headings are given; but the author's chief experiences seem to have been in Java. The Index is classified under Anthropology and Ethnography (including forty-four references to various forms of beverages, for the most part of a stimulant nature, consumed or met with during the journey), Botany, Geography, Mineralogy, Geology and Palæontology, and Zoology.

Luca, Giuseppe de.—Storia Concetto e Limiti della Geografia. Napoli (Stab): 1881, sq. 8vo., pp. 104.

The author, Professor of Geography and Statistics at the University of Naples, dedicates this general dissertation on Geography, considered historically, physically, and educationally, to the recent International Congress at Venice.

Um die Welt ohne zu wollen.—Prag (Mercy): 1881, 16mo., pp. 384.

The log-book of H.I.H. the Archduke Ludwig Salvator of Austria, who, having spent the winter in a rambling journey to Australia across the Indian Ocean, was compelled, by unexpected delay in packet service at Sydney, to return viâ America. A considerable stay was made in Tasmania; and colonial readers will welcome the promise of a separate work from so accomplished an authority upon this island, which he terms "The Pearl of the South."

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Curtius, E., und Kaupert, J. A.—Wandplan von Alt-Athen in 4 Blättern. 1:6000, nebst ein Textheft. Berlin, Schropp. Price 8*s.* (*Dulau.*)

Dufief, —.—Carte de la Belgique à l'usage de l'enseignement primaire et moyen. Bruxelles. 9 sheets. Price 13*s.* (*Dulau.*)

Kiepert, H.—Karte der griechischen Länder mit den angränzenden albanesischen, slavischen und roumanischen. Scale 1 : 700,000 or 9·5 geographical miles to an inch. 9 Blätter. Berlin. (*Dulau.*)

Kummersberg, Hauptm.—Administrativkarte von Galizien und der Bukowina. Scale 1:115,200 or 1·5 geographical miles to an inch. 61 Blätter. Wien, Artaria & Co. Price 2*l.* 10*s.* (*Dulau.*)

Nowack.—Special-Karte d. Prov. Brandenburg. Scale 1:300,000 or 4·1 geographical miles to an inch. Berlin, Schropp. Price 7*s.* (*Dulau.*)

Pohl, J., und Widimský.—Eisenbahn-Karte d. oestlichen Europa mit besondere Berücksicht d. russischen Reiches nach amtl. Quellen bearbeitet. Scale 1:2,500,000 or 34·4 geographical miles to an inch. 4 Blätter. Chromolith. Nebst Stationenverzeichniss. Tabelle. Wien. Price 10*s.* (*Dulau.*)

Vuillemin, A.—Carte physique de l'Europe, indiquant les divisions naturelles orographiques et hydrographiques. Paris, Delalain. Price 1*s.* (*Dulau.*)

ORDNANCE SURVEY MAPS.

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Town Plans—10-feet Scale.

ENGLAND: Ilkeston, 16 sheets at 2s.

Index Maps:—

ENGLAND: Index to the Counties of Bucks, Berks, Oxford, Gloucester, and Wilts, scale 4 miles to 1 inch; Index to the County of Bedford, scale 4 miles to 1 inch; Index to the County of Nottingham, scale 4 miles to 1 inch; Index to the Counties of Hertford and Middlesex, scale 4 miles to 1 inch; Index to the County of Northampton, scale 4 miles to 1 inch.

SCOTLAND: Index to the Counties of Argyll and Bute, scale 10 miles to 1 inch.

ASIA.

Indian Government Surveys:—

Indian Atlas, Sheets: 48 and 131, Quarter Sheets: 33 N.W., 33 S.W., 37 N.E., 66 N.E.—Punjab Survey. Scale 1 inch to a mile. Districts Bannu and Dera Ismail Khan. Sheets: Nos. 2, 9, 15, and 16. Seasons 1874 to 1879.—Bhopal and Malwa Topographical Survey. Scale 1 inch to a mile. Seasons 1878–79–80. Sheets: 42, 56, and 57.—Oudh Revenue Survey. Scale 1 inch to a mile. Sheet No. 129. Districts Bahraich and Kheri. 1881.—Hyderabad Topographical Survey. Scale 1 inch to a mile. Sheets: Nos. 8, 9 and 10 (on one). Season

1865–66.—Trigonometrical Branch, Survey of India. Scale 1 inch to a mile. Sheets 12, 15, and 22 of Cutch. Season 1879–80.—Trigonometrical Branch, Survey of India. Scale 2 inches to a mile. Guzerat, Sheets: 15. Sections 1, 2, and 3. (Season 1876–77.) 25. Sections 1, 2, 3, and 4. (Season 1878–79). 32. Section 2. (Season 1879–80.)—Trigonometrical Branch, Survey of India. Guzerat (Dáng Forests), Section No. 10 of Sheet No. 49, and Section No. 3 of Sheet No. 50. Seasons 1878 to 1880. Scale 4 inches to a mile.—Trigonometrical Branch, Survey of India. Kattywar, Sheets 57 and 58 (on one) and 59. Parts of Okhamandal and Hallar. Scale 1 inch to a mile. Seasons 1878–79–80. — Lower Provinces, Bengal. District Backergunge, 1859–66. Scale 4 miles to an inch.—Lower Provinces, Assam. District Cachar, 1865–70 and 1873-4. Scale 4 miles to an inch. New Map of Gilgit and surrounding Country. Surveyed partly in 1879, and corrected and extended in 1880. Scale 4 miles to an inch.—Map of the Hyderabad Assigned Districts or Berar, combining the Surveys executed under the superintendence of James Mulheran, Esq., in the years 1856 to 1866, with parts of the printed maps of the Nurnulla (Narnala), Gawilghur (Gawilgarh), Maiker (Mehkar), Baythulwady and Bassim (Basim) Circars now included in Berar. Scale 1 mile to an inch. 38 sheets, with index.—Biluchistan Topographical Survey. Portion of Katch Gandava. Season 1880–81. Scale 2 miles to an inch.—Index to the Sheets of the Atlas of India, 1881. Scale 128 miles to an inch. (*Stanford, agent.*)

Intelligence Branch, Quartermaster-General's Department.—Map showing the Sibi and Thal-Chotiali Routes connecting the Khojak with the Indus Valley, also the intervening Mari Country. Scale 1 : 500,000 or 6·8 geographical miles to an inch. Intelligence Branch, Quartermaster-General's Department, War Office, London, August 1881.

Palestine Exploration Fund.—The Revised Map of Western Palestine. Scale 1:163,000 or 2·2 geographical miles to an inch. In 6 sheets and paper cover. Price 12*s.*, to subscribers 6*s.* 6*d.* E. Stanford, London, 1881.

Petermann's 'Geographische Mittheilungen.'—Dr. Albert Regel's Reise nach Turfan, Mai bis Nov. 1879. Nach den Tagebüchern entworfen und gezeichnet von B. Hassenstein. Scale 1:1,500,000 or 20·4 geographical miles to an inch. Nebenkarten: Planskizze von Turfan. Scale 1 : 75,000 or 1 geographical mile to an inch.—Die Ruinen von Alt-Turfan (Stadt des Takianus). Scale 1 : 75,000 or 1 geographical mile to an inch. Petermann's 'Geographische Mittheilungen, 1881, Tafel 18. Justus Perthes, Gotha. (*Dulau.*)

AFRICA.

Chavanne, Dr. Joseph.—Central Afrika. Nach den neuesten Forschungen bearbeitet von Dr. Joseph Chavanne. Scale 1 : 5,000,000 or 66·6 geographical miles to an inch. A. Hartleben, Wien, Pest u. Leipzig, 1881. (*Dulau.*)

This map shows the routes of all the principal explorers, between the years 1868 and 1880.

Kiepert, H.—Algerien und Tunesien nach den vom Depot de la Guerre zu Paris 1855–56 (revid. bis 1867) herausgegebenen Aufnahme Karten, und den Administrativ- und Eisenbahn-Karten von 1876 u. 1880. Tunesien nach den Routiers von Falbe u. Pricot Ste. Marie (K. des Depot de la G. 1857), V. Guérin (1862) und G. Wilmanns (1874). Von H. Kiepert. Scale 1 : 2,000,000 or 27 geographical miles to an inch. D. Reimer, Berlin, 1881. Price 2*s.* (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Cyrenaica. Routen der Expeditionen der "Società d'Esplorazione Commerciale in Africa" unter Cap. M.

Camperio und Comme. Haimann, März und April 1881. Construirt und gezeichnet von Carlo Pedrone. Scale 1 : 1,200,000 or 16·3 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881, Tafel 15. Justus Perthes, Gotha. (*Dulau.*)

AMERICA.

Geological Survey of Canada.—Geological Map of the Province of New Brunswick. Scale 1 : 253,440 or 3·4 geographical miles to an inch. To accompany the Report of Progress. Alfred R. C. Selwyn, F.R.S., &c., Director of the Geological Survey of Canada, Montreal. 4 sheets, map, and sections.

Petermann's 'Geographische Mittheilungen.'—Geologische Karte der Queen Charlotte Islands nach George M. Dawson's Aufnahmen, 1878. Scale 1 : 1,000,000 or 13·6 geographical miles to an inch. Nebenkarte: Skidegate-Inlet nach den Vermessungen von J. Richardson 1872, und G. M. Dawson 1878. Scale 1 : 350,000 or 4·7 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881, Tafel 16. Justus Perthes, Gotha. (*Dulau.*)

——— Tiefen und See-Temperaturen der Bering-Strasse, gemessen von W. H. Dall im U.S. C. Survey Schooner 'Yukon,' 5 Sept., 1880. Scale 1 : 210,000 or 2·8 geographical miles to an inch. Nebenkarten: Hydrothermales Profil der schmalsten Stelle der Bering-Strasse, 5 Sept., 1880. Ansicht des Ostcaps und der Diomedes-Inseln. Von W. H. Dall. Petermann's 'Geographische Mittheilungen,' 1881, Tafel 17. Justus Perthes, Gotha. (*Dulau.*)

AUSTRALIA.

Skene, A. J., M.A., Surveyor-General of Victoria.—Map of Continental Australia, from the most recent information and materials supplied by the Survey Departments of the several Colonies. Constructed and engraved at the Department of Lands and Survey, Melbourne, under the direction of A. J. Skene, M.A., Surveyor-General of Victoria, 1st October, 1880. Scale 1 : 3,127,000 or 44·3 geographical miles to an inch. 2nd edition.

> The first edition of this map was published June 1879, the present (second edition) has been carefully checked, and the areas of the several Colonies verified by independent measurements. It is the intention of the Surveyor-General of Victoria to publish an edition of this map annually, bringing up the information to the latest date.

——— Map of Victoria. Constructed and engraved at the Surveyor-General's Office, Melbourne. Published by authority of the Government, under the direction of A. J. Skene, M.A., Surveyor-General, Melbourne, 1876. Scale 1 : 510,000 or 7 geographical miles to an inch. 3rd edition.

Surveyor-General of Western Australia.—Map of Western Australia. Scale 1 : 2,200,000 or 30 geographical miles to an inch. Compiled under the direction of the Surveyor-General of Western Australia. Survey Department, Perth, 1880. 2 sheets.

CHARTS.

Admiralty.—Charts published by the Hydrographic Department, Admiralty, in May and June, 1881:—

No.			Inches.	
1510	m	=	0·1	Pacific ocean:—Sandwich islands. (Plans, Honolulu and Pearl lochs, Honolulu harbour.) Price 2*s.* 6*d.*
54	m m	= =	0·58 1·50	Korea: — Port Lazaref. Shin Po anchorage. Price 1*s.*
990	m	=	3·0	Liu Kiu islands:—Napha-kiang roads. Price 1*s.* 6*d.*

No.			Inches.	
138	m m	= =	5·4 2·0	Japan, north coast:—Saigo harbour. Ohama harbour. Price 1*s*. 6*d*.
1602	m	=	0·5	China, east coast: — Entrance to the Yang-tse-kiang. Price 2*s*. 6*d*.
1859	m	=	4·6	England, west coast:—King road. Price 1*s*. 6*d*.
1080	m m	= =	1·0 2·0	Tasmania: Tamar river, with port Dalrymple. Price 1*s*. 6*d*.
890	m	=	0·4	South America, east coast:—Formosa to Pernambuco. Price 2*s*.
2793	m	=	29·0	England, south coast, Isle of Wight:—Cowes harbour. Price 2*s*. 6*d*.
1447	m	=	13·7	Ireland, east coast:—Dublin bar and the river Liffey to Carlisle bridge. Price 2*s*. 6*d*.
264	m	=	2·7	Cochin China:—Quin Hon or Thi-Naï harbour. Price 1*s*.
2062	m	=	0·1	China:—Tong-King gulf. Price 2*s*. 6*d*.
155	m	=	2·88	Italy, west coast:—Gulf of Spezia. Price 1*s*. 6*d*.
898	m	=	4·0	Andaman isles:—Port Mouat. Price 1*s*.
447	m	=	0·07	Australia, north coast:—Western approaches to Torres strait. Price 1*s*. 6*d*.

750 Plan added, Quilon road.

536 Plan added, Ogi bay.

(*J. D. Potter, agent.*)

CHARTS CANCELLED.

No.		Cancelled by	No.
1510	Sandwich islands	New chart, Sandwich islands	1510
54	Port Lazaref	New plan, Port Lazaref. Shin Po anchorage	54
990	Napha-kiang road	New plan, Napha-kiang roads	990
1602	Yang-tse-kiang entrance	New chart, Entrance to the Yang-tse-kiang	1602
1859	King road	New plan, King road	1859
1080	Tamar river	New plan, Tamar river	1080
890	Formosa to Pernambuco	New chart, Formosa to Pernambuco	890
2793	Cowes harbour	New plan, Cowes harbour	2793
47	Dublin bar and river Liffey	New plan, Dublin bar and river Liffey	1447
2062	Tong-King gulf	New chart, Tong-King gulf	2062
155	Gulf of Spezia	New plan, Gulf of Spezia	155
2732	Chi-kau to Ning-hai.		
739	Plan on this chart, Boria bay and entrance of Jyghur river.		
1694	Plan on this sheet, Port Dalrymple.		

CHARTS THAT HAVE RECEIVED IMPORTANT CORRECTIONS.

No. 260. North Polar sea. No. 2443. Arctic sea:—Melville sound. No. 21. Magellan strait:—Second narrows to cape Pillar. No. 23. South America, west coast:—Channels between Magellan strait and gulf of Trinidad. No. 1015. Australia, south coast:—Guichen bay to Glenelg river. No. 1182. England, west coast:—Cardiff and Penarth road. No. 24. South America, west coast:—Channels between gulf of Trinidad and gulf of Penas. No. 360. North Atlantic ocean:—

Bermuda islands. No. 29. Pacific ocean, Rapa or Oparo island:—Ahurei bay. No. 8*e*. Red sea:—Red sea, sheet 3. No. 2070. Mediterranean:—Saloniki bay. No. 534. South America, north coast:—Approaches to Cayenne. No. 1750. Australia, south coast:—Port Adelaide. No. 1923*a*. North America, west coast:—Cape Caution to port Simpson, northern portion. No. 1014. Australia, south coast:—Cape Jervis to Guichen bay. No. 2762. Indian ocean:—Comoro islands, &c. No. 2252. Baltic sea:—Gulf of Bothnia. No. 1422. North America, east coast:—Labrador. No. 2795. North America, west coast:—Cerros island. No. 758. Indian ocean:—Madagascar, northern portion. No. 2118. Arctic sea discoveries. No. 274. North Polar chart, Atlantic side. No. 278. North Polar chart, Pacific side. No. 347. Australia, east coast:—Percy isles to Whitsunday island. No. 214. Pacific ocean:—Solomon islands. No. 2764. Australia, east coast:—Coral sea, sheet 2. No. 2809. China:—Yang-tse-kiang. (*J. D. Potter, agent.*)

Dépôt des Cartes et Plans de la Marine.—Chart No. 3648. Plan du Port de Boulogne et de ses environs. 1879.—No. 3805. Golfe du Tong-Kin. Rade de Ba-Moon. 1880.—No. 3828. Golfe du Tong-Kin. Entrée de la Rivière de Long-Moon. 1880.—No. 3665. Côtes du Pérou. Ile Lobos de Tierra. 1878.—No. 3737. Mer des Indes. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série C. Janvier, Février, Mars. 1880.—No. 3738. Mer des Indes. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série C. Avril, Mai, Juin, 1880.—No. 3739. Mer des Indes. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série C. Juillet, Août, Septembre, 1880.—No. 3740. Mer des Indes. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série C. Octobre, Novembre, Décembre, 1880.—No. 3764. Océan Pacifique. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série D. Janvier, Février, Mars, 1880.—No. 3765. Océan Pacifique. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série D. Avril, Mai, Juin, 1880.—No. 3766. Océan Pacifique. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Serie D. Juillet, Août, Septembre, 1880.—No. 3767. Océan Pacifique. Cartes de la direction et de l'intensité probables des Vents, par L. Brault, Lieutenant de Vaisseau. Série D. Octobre, Novembre, Décembre, 1880.—No. 3798. Océan Pacifique Sud. Iles Marquises. Ile Hiva-Oa. Baie des Traitres. 1880.—No. 3807. Océan Pacifique Sud. Ile Futuna. Croquis de l'anse de Sigave. 1880.—No. 3797. Océan Pacifique Sud. Iles Marquises. Ile Nuku Hiva. Crique des Tai-Oa. 1880. Dépôt des Cartes et Plans de la Marine. Paris.

Indian Marine Survey.—Charts Nos. 63, Sadashivgad Bay, including Port Kárwár and Beitkul Cove, price 2*s*., and 161, Stewart's Sound, North Andaman Island, price 2*s*. Published at the Marine Survey Department under the superintendence of Commander A. D. Taylor, Superintendent of Marine Surveys. Calcutta, August, 1881.

United States Hydrographic Office.—Chart No. 877. Harbors of Guatulco, Santa Cruz and Tangola Tangola. From a survey by Commander J. W. Philip, U.S.N., and the Officers of the U.S.S. *Tuscarora*. 1879. Published June 1881 at the Hydrographic Office, Washington D.C. J. C. P. de Krafft, Captain U.S.N., Hydrographer to the Bureau of Navigation. Price 1*s*. 3*d*.

ATLASES.

Bartholomew, J.—Philips' Handy Atlas of the Counties of Ireland. Constructed by John Bartholomew, F.R.G.S.; revised by P. W. Joyce, LL.D., M.R.I.A. With consulting Index. G. Philip & Son, London and Liverpool. 1881. Price 3*s.* 6*d.*

Bevan, G. Phillips, F.S.S., F.G.S.—The Statistical Atlas of England, Scotland, and Ireland. Edited by G. Phillips Bevan, F.S.S., F.G.S. To be completed in fifteen parts, each containing three coloured maps and letterpress. Parts: VII. Agricultural. VIII. Military and Naval. IX. Legal. X. Railway and Telegraph. W. & A. K. Johnston, Edinburgh and London, 1881. Price 7*s.* 6*d.* each part.

Vuillemin, A.—Atlas de l'Europe physique. Bassin des grands fleuves de la France et de l'Europe d'après les documents les plus autorisés. Paris, Delalain. Price 9*s.* (*Dulau.*)

GLOBES AND EDUCATIONAL.

Juvet & Co.—Time Globe, manufactured by Juvet & Co., Canajonarie, New York, U.S.A., 1881.

This is an ingenious application of horology, as a motive power, to an ordinary globe, by which the diurnal revolution of the earth on its axis is exhibited.

The mounting is very light and strong, and so constructed that nearly all the globe is exposed to view, and this is certainly a great advantage over the old method, where all the hemisphere below the wooden horizon is nearly hid from sight. The clockwork contained in the globe does not only exhibit the earth's revolution on its axis, but by means of an ordinary transparent clock-dial gives mean time, thus illustrating to the student the relations between time and longitude, and answering all purposes as a timekeeper, while it is well calculated for use in giving object lessons, such as the causes of day and night, their duration, and all phenomena connected with diurnal motion.

The globe is well covered, the maps being printed in colours showing Isothermal lines, and ocean currents. The prices of 12-inch globes vary from 10*l.* to 12*l.*

Kiepert, H.—Physikalische Wandkarten. No. 5. Africa. Scale 1 : 8,000,000 or 109·5 geographical miles to an inch. Neubearbeitung von Richard Kiepert. D. Reimer, Berlin, 1881. 6 sheets. Price 8*s.* (*Dulau.*)

This a very well executed map. The heights are shown by two shades of colour, and depressions below sea-level by one, while all that portion of the surface below 1000 feet is left white. It would be difficult to find a map which, at a glance, would convey a more correct idea of the physical features of Africa than this last production of Dr. Richard Kiepert. A large inset map showing the political divisions of Africa is also given.

——— Politische Schul-Wandkarten. Africa. Scale 1 : 8,000,000 or 109·5 geographical miles to an inch. Bearbeitet von Richard Kiepert. D. Reimer, Berlin, 1881. 6 sheets. Price 8*s.* (*Dulau.*)

This is precisely the same projection as the 'Physikalische Wandkarten,' but is of course coloured to show the political geography of Africa.

Le Globe Chinois.—Paris, chromolith. Erhard. (*Dulau.*)

ATLASES.

Bartholomew, J.—Philips' Handy Atlas of the Counties of Ireland. Constructed by John Bartholomew, F.R.G.S.; revised by P. W. Joyce, LL.D., M.R.I.A. With consulting Index. G. Philip & Son, London and Liverpool. 1881. Price 3s. 6d.

Bevan, G. Phillips, F.S.S., F.G.S.—The Statistical Atlas of England, Scotland, and Ireland. Edited by G. Phillips Bevan, F.S.S., F.G.S. To be completed in fifteen parts, each containing three coloured maps and letterpress. Parts: VII. Agriculture. VIII. Military and Naval. IX. Legal. X. Railway and Telegraph. W. & A. K. Johnston, Edinburgh and London, 1881. Price 7s. 6d. each part.

Vuillemin, A.—Atlas de l'Europe physique. Bassin des grands fleuves de la France et de l'Europe d'après les documents les plus autorisés. Paris, Delalain. Price 9s. (*Dulau.*)

GLOBES AND EDUCATIONAL.

Juvet & Co.—Time Globe, manufactured by Juvet & Co., Canajonarie, New York, U.S.A., 1881.

This is an ingenious application of horology, as a motive power, to an ordinary globe, by which the diurnal revolution of the earth on its axis is exhibited.

The mounting is very light and strong, and so constructed that nearly all the globe is exposed to view, and this is certainly a great advantage over the old method, where all the hemisphere below the wooden horizon is nearly hid from sight. The clockwork contained in the globe does not only exhibit the earth's revolution on its axis, but by means of an ordinary transparent [illegible]-dial gives mean time, thus illustrating to the student the relations between time and longitude, and answering all purposes as a timekeeper, while it is well calculated for use in giving object lessons, such as the causes of day and night, their duration, and all phenomena connected with diurnal motion.

The globe is well covered, the maps being printed in colours showing Isothermal lines, and ocean currents. The prices of 12-inch globes vary from 10*l.* to 12*l.*

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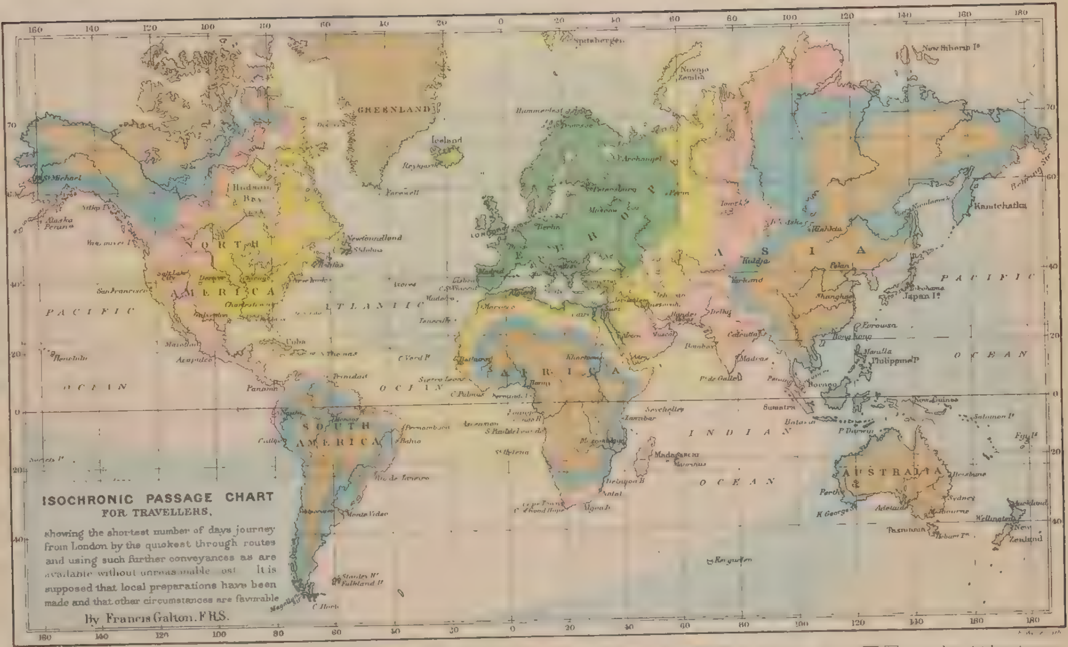

ISOCHRONIC PASSAGE CHART
FOR TRAVELLERS,

showing the shortest number of days journey from London by the quickest through routes and using such further conveyances as are available without unreasonable cost. It is supposed that local preparations have been made and that other circumstances are favorable

By Francis Galton, F.R.S.

J. Sharbau F.R.G.S. del.

Explanation of colours Green 🟩 within 10 days Yellow 🟨 10-20 days Pink 🟥 20-30 days Blue 🟦 30-40 days. Brown 🟫 more than 40 days journey

Published for the Proceedings of the Royal Geographical Society, 1881.

PROCEEDINGS

OF THE

ROYAL GEOGRAPHICAL SOCIETY

AND MONTHLY RECORD OF GEOGRAPHY.

On the Sierra Nevada of Santa Marta and its Watershed (State of Magdalena, U.S. of Colombia). By F. A. A. Simons.

(Read at the Evening Meeting, November 14th, 1881.)

Map, p. 763.

Some two years ago this Society was kind enough to publish a map and a few casual notes sent by me from Santa Marta; since then I have made many more excursions into the interior of the Sierra Nevada, and have paid particular attention to the water system. Now, after a sojourn of three and a half years in the district, I feel more competent to give a detailed description of this wonderful snow-capped mountain. An introductory sketch, however, of the topography of the State of the Magdalena will greatly help to clear up the uncertainty that hangs over this almost unknown country.

The Magdalena State occupies the north-east corner of the Colombian Republic, and is in fact a triangular wedge between the Andes and the Magdalena river, with the Caribbean Sea as a base. It boasts two distinct mountain systems, the one an eastern ramification of the Andes, which runs the whole length of the State (separating it from the neighbouring republic of Venezuela) and at last disappears at the Goajira Peninsula, not entering it as shown on many maps. The other is the Sierra Nevada of Santa Marta, running due east and west, parallel with the coast-line, and known at the time of its discovery as the Sierra Tairona.

The Sierra Nevada is not only completely isolated from the Andes by two large rivers—the Rio Rancheria flowing into the Caribbean Sea and the Rio Cesar, a large affluent of the Magdalena—but is of a distinct geolcgical formation, probably a granitic upheaval some time after the coal measures. Its physical properties are also very different, its surface presenting chiefly a wilderness of steep grass-covered hills and rugged peaks, and although capped by eternal snow with its accompanying abundance of streams and rivers, forest vegetation on its slopes rarely passes the limit of 5000 feet above the sea-level; whereas on the flanks of the Andes, across the valley of the Rio Cesar, dense impenetrable forests ascend to the very summit, which at Villanueva is between 10,000 and 12,000 feet above sea-level.

The height of the Sierra Nevada has been strangely misrepresented. These errors have, I believe, been mainly due to the apparent large mass of snow as seen from the sea, compared to the small sprinkling viewed from the various points in the interior. Now a good deal of the supposed snow seen from seawards is only reflected light from micaceous granite. Again, the time of year has a great deal to do with it, for in December and January, and often in August, I have seen snow as low down as 9000 feet. The most picturesque view of the Nevada is certainly from the sea; I shall never forget the first glimpse I caught of it, while crossing from Curaçao to Rio Hacha in a Dutch schooner. A glorious tropical sunset had tinged the fantastical line of snowy needles a delicate rose colour, while, lower down, the many interesting ramifications stood out distinctly in a fine glow of purple on a dark blue base. From the many points in the interior where the higher portion is visible, the view of the Nevada is decidedly what the Americans would call "mean," and I was rather surprised at finding a general belief among the country people that the sprinkling of snow was in reality chalk.

After several vain attempts I was enabled last year definitely to determine the exact height of the Sierra Nevada. Provided with a complete set of Wollaston's boiling-water apparatus and aneroids, kindly supplied me by this Society, besides my own instruments, I set out from San Sebastian, accompanied by three Indians and their families, on the 1st of August. The four of us were mounted on Indian horses, the women and children following on foot, and driving bullocks laden with a fortnight's provisions, as little can be had in the high regions. These horses are wonderful climbers and as sure-footed as mules, going up and down the worst places without the least trouble; wearing no bit, they feed as they go along, and often, if the start is to be early next morning, are kept tied up without food all night; they never taste Indian corn nor any other grain. The Indians dislike donkeys, and will have nothing to do with mules, although they breed them sometimes. The Arhuaco Indian is not a good horseman; on a journey he always wears some ten to twelve gaily-coloured bags full of dainties, which make mounting a difficult task, for the saddle of course gets its share of bags too, and the help of a large stone is necessary to assist him up. We travelled very slowly, stopping at every convenient shelf or resting place in the ascent to readjust saddles, and overhaul the contents of these mysterious bags, as the Indians, when they can, indulge in a dozen or so meals a day.

Towards sunset, after having scaled two passes, 10,000 and 12,000 feet respectively in height, we were not sorry to reach the lovely green pastures of Adurimeina, where the Government have had a hut built, open to all travellers, a most commendable and useful institution, and there is not a path in the whole territory of the Nevada that has not these huts at half-day stages. Should they be burnt down or otherwise destroyed, every Indian must contribute his mite for their immediate reconstruction. Starting early the next morning, we managed, after much fatigue, partly on foot and partly on horse, to reach the third pass, 14,000 feet high, before the afternoon clouds obscured the view. It had threatened rain all the morning, so I was agreeably surprised to find the clouds breaking, and the whole snowy range of peaks standing boldly out on a deep blue sky. The scenery of the Sierra Nevada is excessively grand, but it is too desolate, too barren, to be really beautiful; even the loveliest flowers, at this time of year so abundant, appear small and insignificant, and are entirely lost amid the general desolation. Late in the afternoon we arrived at headquarters, an Indian cattle corral on the Rio Cataca, the highest habitation in the Nevada. The mean boiling-point here was 194·4°, giving a height of 9500 feet; this is considerably below the aneroid observations of my previous visits, which were often as high as 11,000 feet above sea-level. The Indians feed large herds of cattle and sheep on the rich pastures of the Nevada, but do not attend to them, so they run completely wild, and are for commercial purposes totally lost. Pigs, not the indigenous wild pig, but domestic animals brought up by the Indians and then abandoned, are plentiful, and, together with a red buck, which is also pretty common, afford capital sport. The only drawback is the trouble of getting up plantains, maize, and other bread-stuffs from San Sebastian, the time we were able to remain being regulated by their supply, for nothing will induce the Indian to stay after the last plantain is consumed. After spending a few days in reconnoitring the surrounding heights, we started on the 6th, and made our way up one of the numerous valleys, which all run north and south, at right angles to the central or snowy range; these again are cut by the river Cataca and two of its affluents which flow parallel to the snowy peaks.

Five hours of rather dangerous riding, along mountain ridges and the banks of deep blue lakes, brought us into a sort of cul-de-sac, where all further progress on horseback was stopped by perpendicular masses of rock. An observation taken here showed the boiling-point of water 188·1°, or 13,000 feet. Singling out a promising looking crevice in the rock, we managed, after sundry gymnastic performances, which reminded me very much of wriggling up a somewhat narrow chimney, to reach the foot of a large field of frozen snow, the long-sought-for goal of my former journeys. Indians have a most determined objection to walk on snow, they complain (and with very good reason to) that it burns their feet, so I left them to wait my return and pushed on alone, another terrible four hours of hard work. What hitherto appeared as terraces and fields of hard smooth snow most inviting to the eye, now became a tumbled up, heterogeneous mass of frozen snow and ice, with frightful precipices, bridges, caverns full of brilliant icicles, and all the other splendours and charms that make glacier travelling so enticing and so dangerous. Each step had to be cut in the soft yielding snow, and well stamped down to secure a footing. Thus after many futile attempts I reached a small sheltered spot right in under a projecting rock, the foot of the highest peak. Here all further progress was barred by the nature of the rock, and I discovered, to my great mortification, as far as the dense white clouds would permit, that although near to the summit the last bit of rising ground was inaccessible. The view, obscured by mists at this time of the year, must at other seasons be truly magnificent; but, nearly blinded with the snow reflection and enveloped in a dense white fog, I could scarcely see a couple of feet ahead, and with the bitter cold, besides being wet through with snow-digging and frequent involuntary tumbles, managed with difficulty to take an observation. The temperature of boiling water proved to be 181·2° Fahr.; we were, therefore, nearly 17,000 feet above the sea. I was now far above the general chain of snow-fields and minor peaks, and allowing at the most 500 feet for the rock and patch of snow that still separated me from the summit, would give a maximum height of 17,500 feet for the Sierra Nevada of Santa Marta.

As may be easily imagined, from a range capped with eternal snow, the Sierra Nevada gives birth to innumerable rivers. Few States in the world can boast such a natural or more easily applied irrigation, and few tropical countries have such a supply of ice-cold water laid on to their very doors, as the seething hot valley of Dupar and the towns along the Ciénaga to Santa Marta. This water system may easily be divided into three distinct sections. 1st, the Rio Cesar with its tributaries; 2nd, the Rio Rancheria, and others falling into the Caribbean Sea; and 3rd, the two large rivers that form the Grand Ciénaga.

The Rio Cesar is, after the Cauca and Sogamozo, the largest tributary of the Rio Magdalena. It rises in a comparatively low portion of the Nevada, the fountain-head being scarcely 3000 feet above the sea. Rosario, a small Indian village of about 100 inhabitants, 10 miles from San Juan, at an elevation of 2000 feet, lies within the fork of the two chief springs that form the river, which here flows from west to east. At Corral de Piedra, formerly only a cattle farm, now a small village three miles from San Juan, the river, much increased by numerous mountain rivulets, falls some 20 feet over rocks, and dashes over some very stony ground to San Juan, taking at the same time a sharp bend to westward. San Juan de Cesar is a clean little town of about 1500 inhabitants on the right bank of the river, which is here 300 yards broad, but shallow, with a fine sandy bottom, and which from here flows almost due north to south its whole length to the Magdalena. The town is of comparative recent origin, and has fewer ruins than any other in the State; the principal trade is with Rio Hacha, of which they have secured the lion's share. The three principal tributaries of the Rio Cesar, viz. the Badillo, the Guatapuri, and the Ariguani, each almost as large as the parent river, are from the Nevada, whereas the watershed from the Andes is exceedingly scant, consisting only in small rivulets, dangerous enough perhaps when swollen by continuous and excessive rains, but usually all dried up the better part of summer.

Rio Badillo, the first important affluent of the Rio Cesar, springs somewhere from the snowy regions, east of the Guatapuri, although I have never been able to find out exactly where. It is a much larger river than its neighbour and brings down an enormous mass of water, being in the driest summer two to three feet in depth. The Cesar, although always flowing at San Juan, soon becomes lost in the dry season, and is for many miles high and dry, till it receives the waters of the Badillo. In the fork of the junction of these two rivers, a small village is springing up, Palmerito. Some eight miles up, on the eastern bank, is the old town of Badillo, before the independence, a place of several thousand inhabitants, and a wealthy commerce in dye-woods, which were exported in large canoes that ascended the river from the Magdalena. Since the decline of navigation on the Cesar, it has gradually fallen, and was with the terrible Revolution of 1860 completely ruined. The town is a conspicuous object through a large white church that is seen from either the Nevada or the Andes. A little further up is the rising settlement of Patillal. All the country between this and the Rio Rancheria is very healthy and well adapted for emigrants, who at cattle-breeding could easily double their capital, however small, every two years. A mile below the junction with the Cesar, is the first ferry, Martin Ramos, on the high road from Valle Dupar to Villanueva. Lower down the Rio Seco, draining a fine bold mountain mass which separates the Badillo from the Guatapuri, now offers its mite to the already majestic river.

Rio Guatapuri, although not so large as the preceding, makes up by its impetuosity for any want of water, and is the most dangerous river in the whole State, rising in a few hours as many feet. It springs from several lakes in the eternal snow region and passes among the highest peaks of the Nevada, thus its waters are at a very low temperature even at its junction with the Rio Cesar. On its western bank, some five miles up, lies the ancient city of Los Reyes de Upar, or as it was often called, "The Three Kings of Upar," founded in 1546 by Juan de Céspedes, and now known as Valle Dupar. It is said once to have boasted 10,000 to 12,000 inhabitants, and a busy trade with the Magdalena, chiefly Mompos, carried on in large barges, which came up to Salguero, the chief port on the Cesar, and not six miles from Valle Dupar. The two places are still connected by a broad carriage road, but alas, Salguero counts at present eight huts, and Valle Dupar scarcely musters a thousand, although the election sheets manage to make out over three thousand inhabitants. The main business is cattle-breeding, but nothing like the former times, when a proprietor counted his herds by thousands and tens of thousands; now they are happy with hundreds, and since the great demand for Cuba, business is rather brisk. Still Valle Dupar is with her commerce utterly ruined, the richest town in the whole province, a number of her citizens having large sums in Spanish gold buried away.

All the people about here are fond of burying money, and have a decided mania for treasure-hunting. The Indians also share a little in the infatuation, and on two occasions they made me their confidant. The first was on a journey from Atanques to San Sebastian when, in the centre of the highest peaks and across a narrow ridge, my guide pointed out the true valley of the Tairona, where all the wealth of those Indian warriors that caused the first Spaniards so much trouble, lay concealed. It was at least 3000 feet down a fearful precipice, which I did not mind, however; but the getting up again was another business, so I declined. Another time, while among the lakes in the snowy region, my old Indian guide, in a fit of affection, took me up to a plateau, if possible more weird and dismal-looking than the rest, where, in the centre of a circle of upright stones, were piled a curious collection of carved pieces of shells, cowries, coral, and a quantity of red Berlin wool, enough to fill a couple of sacks. On approaching he took off his hat, would not let me approach within touching distance, and seemed altogether in anything but a comfortable state of mind. He told me it was the great god of the Freilijon (a certain tree that only grows above 11,000 feet). I could get nothing more out of him respecting it, but expect it is some offering to prevent their calves being killed by condors, or their cows falling into the many lakes and devoured by great serpents; for shells are an article of trade, and expensive in the Nevada, their chief use being to calcine and form the powder with which they work their *poporo*.* If, as it is averred, although I much doubt it, these Arhuaco Indians possess gold, it is concealed here or in that, as yet, totally unknown region lying between the San Lorenzo de Santa Marta and the snowy portion of the Nevada, which does not seem ever to have been entered by the Spaniards.

The only tributaries of the Rio Cesar on the eastern or Andean bank are: Rio del Molino, which takes its name from the town on its banks; a very old village, with rich copper mines now closed up, it is coming into life again through its coffee plantations. Rio de Villanueva, also like most of its neighbours, owes its name to the enterprising little town on its banks, the emporium of the newly sprung up coffee trade. The coffee exported last year amounted to 250 tons. Villanueva lies at the foot of the Andes; the lower hills or range now being planted with coffee is called Sierra Negra, while at its back, separated by valleys, rise the high crests of the true Cordillera to 10,000 and 12,000 feet, called from its picturesque coloured forests and rocks Sierra Pintado. From this sierra the Andes gradually diminish till they are lost in the Goajira Peninsula. Not many years ago a rugged footpath led across the high range of the Andes from Molino to Perijá in Venezuela; the frequent attacks on and of the Motilones Indians caused it to be abandoned. All these mountains are well wooded, and rich in cinchona bark and india-rubber, so ere long the greed of gain will probably overcome the ridiculous fear of Indians. Rio de Urumita, with town of same name. This little village also is commencing coffee plantations; it is prettily situated almost among the hills, with a fine dry climate. Having, in consequence, a reputation among consumptive patients, it is generally full of visitors. Rio Marquezote, with ruined village of San José, now only a few cattle corrals. Rio Pereira, coffee plantations of Manaure at its source. Rio de la Paz, with the village of La Paz, which at present is looking up again; its chief product is sugar. Rio de Chiriaimo, with the old Indian villages of Tupes and San Diego, or as it is sometimes called, Diegopata. The Tupes Indians gave great trouble to the founders of Valle Dupar. Then follow in succession Rio del Jobo, Rio de la Puente, and Rio del Espiritu Santo, with their respective towns, Jobo, Palmira, and Espiritu Santo. These three districts form the national territory of the Motilones, and were with the Nevada ceded by the State to the nation for twenty years, for the purpose of more effectually civilising the Indians. This experiment has been so far successful with the Nevada or Arhuaco Indians, and now all their young men and boys can read and write Spanish, and more or less understand the language. With the Motilones it is, through bad management, a most lamentable failure, and, under the plea of castigating them, regular man-hunts, where neither man, woman, nor child are spared, have been organised. The Indians are spirited warriors, although small in number; their revenge is swift and deadly, so it is feared all three towns will have to be abandoned. For years they have been in a state of siege. When water is required, washing or wood-cutting to be done, half the male population have to turn out as escort; even with all these precautions a straggler is often picked off by the Indian sharpshooters. Rio Sicarare, Rio Candela, Rio Casacará, and Rio de Becerril, complete the eastern tributaries.

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* Every Arhuaco Indian chews coca, and carries his poporo; this instrument is merely a small gourd, round the upper rim of which he rotates a stick, previously wetted with his saliva impregnated with the green juice of the coca, and then dipped into very fine calcined and pulverised shells carried inside the gourd. This constant application gradually raises a thick incrustation of lime. The custom has no practical utility, and is, like smoking, merely to kill time.

The Rio Cesar, after receiving the Guatapuri, becomes a respectable-sized river, no broader than at San Juan, but much deeper. It flows southwards through a broad belt of forest, chiefly cedar, lignum vitæ, and brazilwood. Numerous huts at short intervals line its banks, the remains of villages or plantations. At one of these, Soledad, the river branched off to westward once upon a time, and in many places the old bed still exists, but the mouth has been completely lost. Further down is El Toco, the old port of Valencia de Jesus, and once as important as Salguero. A ferry is kept here by the National Government for postal communication between Espiritu Santo and the capital, Atanques, in the Nevada. A few miles below the disemboguement of the Rio Espiritu Santo the Cesar divides, forming an island some 15 miles long. The western branch, Caño de la Cañada, is the real river; it is broad and shallow, whereas the eastern branch, or Caño Matanza, is narrow but very deep; this latter is artificial, being formed by the attempt of a gentleman to bring water on to his farm. Nearly the whole river followed after, and one fine day rising drowned him out. On reuniting, the river is narrow and proportionately deep; it is soon joined by the Rio Guaimaral, another narrow and deep channel, the original Cesar, which has caught up all the large tributaries from the Nevada, such as Rio Azucarabuena, Rio Sambapalo, Aguas Blancas, Pesqueria, Maria Angola, Diluvio, and Garupal. These three last are dangerous rivers in the winter, and difficult to ford; the two last never dry up.

All these rivers flow through lovely savannahs stretching from Valencia de Jesus to the Magdalena, between the foot of the Nevada and the Andes. The cattle-breeders of Valle Dupar own these pastures as far as the Rio Ariguani. During the three summer months, when these plains are parched and dried up by the sun, they are burnt, and the cattle driven down to the fresh pasturage along and among the cool islands of the Cesar, where each proprietor has his house and grounds. Between the Diluvio and Garupal is the small village of Camperuche, composed of a few straggling corrals, but important, as the high or postal road from Valle Dupar branches here; that to Santa Marta crossing the Sierra to Fundacion, the other over endless prairies through the fast rising village of Venados and El Paso to El Banco and the Magdalena. The outspurs of the Nevada are very rich in copper about here, and coal is found near Valencia with the copper. Rich deposits of coal and copper are also reported near Espiritu Santo. The Rio Cesar, after uniting with the Rio Guaimaral, makes several large curves, and flowing through a flat country, overfloods everything at the slightest rising. It is soon joined by the Rio Ariguani. This last and largest tributary springs from the mountain of Chinchicua, in the Nevada, 11,000 feet high, at the base of which is the peculiarly formed plain of Pueblo Viejo, issuing like an enormous glacier from the foot of the mountain, on one side of which flows the main stream of the Ariguani, and on the other its affluent; both are 60 to 150 feet below the plain, which rises in a perpendicular wall with angles at various distances, not unlike the huge wall of a fortress. Towards the centre of the plain are the ruins of an old walled village, in very good preservation, said to be the original Valencia, founded with San Sebastian by order of the King of Spain. I suppose the sand-flies, which are extraordinarily abundant and of a most vicious disposition here, must have driven the inhabitants to seek their present quarters on the Rio Mocho. At the foot of the plain are numerous sugar and coffee plantations, producing the finest sugar and coffee in the State. They are flanked by a very high range of 10,000 feet, that gives birth to the rivers Maria Angola, Diluvio, and Garupal. The Ariguani is forced westwards by these hills, making a large curve round the flank of the south-west spur of the Sierra Nevada, and flows through a small lake some 10 miles before entering the Cesar. On the banks of this lake is the fishing village of El Paso, formerly a large port. On the other side of a small stream lies a large cattle corral, Las Cabezas. It was here that General Codazzi took up his headquarters and determined its position. Through the kindness of its owner, Don Oscar Trespalacio, who takes a great interest in the geography of his country, I am enabled to give the General's observations: lat. 9° 29′ 30″ N.; long., meridian of Bogotá, 0° 23′ 7″ E. Elevation, 174 feet above sea-level.

Between the Rio Ariguani and the Magdalena the country is very low and swampy, the water collecting in the hollows forms countless pools and channels, &c. Most of the eminences are occupied by cattle corrals, these swamps being, in spite of the abundant insect life, favourite pasture grounds during certain months of the year. By far the largest and most important of these lakes, is the lagoon of Zapatosa; this large expanse of water, many square miles in extent, is due to the reflux of the waters of the Rio Cesar, which, while endeavouring to discharge themselves into the Magdalena, are thrown back by the enormous mass of water pouring down in the opposite direction, for the river Magdalena flows from south to north. On the banks of the lagoon of Zapatosa are two important villages, Chimichagua, on the west, and Chiriguana, on the east. Besides an important industry in dried fish, they manufacture a peculiar mat, many thousand dozens of which are sent to the annual fairs of Mangangué. They grow also in these swamps great quantities of Indian corn. Chiriguana, the larger of the two, cultivates cacao, exporting at present in small quantities. It may soon have an important trade in cinchona bark, now that attention is being turned to the vast forests that rise in its rear. Chiriguana pineapples always have enjoyed a reputation throughout the State for their sweetness and immense size.

At the junction of the main mouth of the Rio Cesar lies the dilapidated town of El Banco, subject, like most of the other places on the Magdalena, to yearly inundations. A proof of the instability of tropical rivers is well demonstrated at El Banco, for here, probably caused by the sand brought down by the Rio Cesar, the Magdalena bends suddenly westwards, enlarging the channel of Brazo de Lobo, and pours the bulk of its waters into its tributary the Cauca, a little above Mangangué, to the no small terror of the Momposinos. This industrious and commercial little town (Mompos, 8000 inhabitants), instead of seeing a broad, deep, navigable river flow along its quays, is disgusted with the stagnant, green, discarded, moat-like appearance of its former powerful ally. While staying in Mompos this year, I was astonished to see the scarcity of water, even for drinking purposes, whereas at Mangangué the river (they call it the Cauca, but it is evidently at present the Magdalena) was in places 30 feet deep and over a mile in breadth.

By glancing at the map and noting the opposite courses of the Rio Magdalena and Rio Cesar, it will at once become apparent, that if no binding mountain ridge unite the two systems, it is quite possible for the Magdalena to gain the sea on the eastern as well as the western side of the Sierra Nevada. Now no such ridge exists, and the 10 or 12 miles which separates the Rio Cesar from the Rio Rancheria (falling into the Caribbean Sea) is a level plain. So it is very probable that in former times the Rio Magdalena, following the foot of the Cordillera de los Andes, discharged itself into the sea at Rio Hacha, or between that place and the lake of Maracaibo. Thus the low, unwatered sandy plains of the Goajira Peninsula may easily be explained as sandbanks at the mouth of some former large river. The Sierra Nevada, during that period, would then have formed an island in the delta of the Magdalena river. A gradual elevation on the eastern flank (the difference of elevation between Fonseca on the Rancheria, or San Juan on the Cesar, and El Banco, at the present day is scarcely 450 feet) would easily compel the river to seek its present outlet.

Abandoning suppositions, we now come to the northern watershed of the Nevada. The principal river that flows into the Caribbean Sea is the before-mentioned Rio Rancheria. It springs from a series of high peaks, a continuation of the main or central range, that gives birth to the Badillo and Guatapuri, but which are not actually covered with snow, except in the cold season (from December to March). The two main streams unite at the Indian village of Marocaso, from whence they flow a broad shallow river, in a southerly direction; till cutting through some magnificent blue limestone strata, it takes a sudden bend eastwards, and enters the Goajira territory a considerable distance to circumvent the easterly spur of the Nevada, already cut through at the limestone. This accomplished, it takes a north-westerly course, and discharges itself into the Caribbean Sea, two miles east of Rio Hacha. Formerly this river, with the important town founded at its mouth, was called Rio de la Hacha, from some legend of the first settlers presenting the tomahawk of peace to the Indians. The town is now contracted to Rio Hacha, and the old river mouth no more exists. In an exceptionally heavy wet season the Rio Rancheria, swollen by the great rains, took a wrong bend, and forcing a way through the sandy foreshore, made itself a new outlet, to the great consternation of the Riohacheros, who now in the dry season have to carry all their water nearly three miles. The mouth and lower portion of the river is called Rio Calancala. The tributaries of the Rio Rancheria are all small mountain streams; the Quebrada is the largest, and seldom dries up, so that the river at Fonseca is nearly as large as at its mouth. It flows over rocks in a series of rapids to Corazonal, where, passing over a small fall of only a few feet, it is navigable to the sea for small canoes. Its utility as a navigable river, however, is much impaired by short bends and the narrowness of its bed, not to speak of the warlike Goajira Indians. Twice during the last two years have the Colombian officials been driven out of Soldado (the capital or headquarters of the national Goajira territory), the place burnt, and communication cut between Rio Hacha and the province, by the Indians threatening to take possession of the high road between Treinta and Pantano. These Indians are a periodical nuisance to everybody living between Barrancas and Rio Hacha, besides costing the nation thousands a year to keep up a train of cowardly, useless officials, who spend most of their time in Rio Hacha annoying their more industrious neighbours.

The villages on or near the Rio Rancheria are—Marocaso, with a small trade in ropes, hammocks, &c., made from the aloe fibre; Carocolí on the opposite bank of the river; and Tembladera, 12 miles from the river, are a mere collection of cattle corrals. These three hamlets are included in the fourth corregimiento of the national territory of the Nevada. Chorera, picturesquely situated on the northern bank in a narrow valley at the foot of an enormous wall of blue limestone, rising perpendicularly on the other side of the Rio Rancheria to about 500 feet, and continuing for many miles. Formerly a trade in brazilwood kept this retired little place somewhat animated, but the poor quality of the wood now barely pays its freight to the coast. The merchants at Rio Hacha divide brazilwood into three qualities:—The finest, said to exceed any in the world, grows in luxuriant abundance between the rivers Guatapuri and Garupal on both sides of the Cesar; it cannot, however, at present be exported, on account of the price and scarcity of mules, besides the distance to the coast and absence of all roads. The second quality, that now exported from Rio Hacha, is usually collected at Badillo by the muleteers of San Juan and Fonseca; about 300 tons are annually sent down to gain freight when business is slack. The third, or inferior kind, is found north of the Rio Rancheria. The high road or chief mule track from Rio Hacha to the Province, as the many small towns in the interior, San Juan, Fonseca, &c., are collectively called, crosses the river a mile and a half below Chorera, so that when the river is swollen by rains and not fordable, the village serves as storehouse and general halting-place. After crossing the river the main road divides:

one direct to San Juan, the other down stream to Fonseca, on the southern bank. This village is, after Valle Dupar, the richest and prettiest in the interior; it also has commenced coffee plantations in the neighbouring Andes. Six miles to the south are the important sugar plantations of Cañaverales, scattered between the Corraleja and the Cañaboba, two minor affluents of the Quebrada. Six miles further south the cattle-breeding hamlet of Tablazo, with a pretty little church; the nearest water to this place is a dirty pool two miles distant. At Fonseca the high road again crosses the river to Barrancas, a few miles down on the northern bank of the Rio Rancheria. Barrancas has an Indian trade in rum and horses; the latter, when bred there, are far superior to the Goajira animals, as they are accustomed to stony roads and many insects, especially flies, both totally unknown in the Goajira Peninsula. In its vicinity are several mineral springs, one highly sulphurous, and an important outcrop of the vast coal-bed that extends from the Magdalena through the whole length of the Cesar valley, coming to the surface at various places near Espiritu Santo and Valle Dupar, at this place, at two more near Soldado, and finally traversing the whole of the Goajira district, where, according to Indian report, it crops out in many places along the coast.

Between Barrancas and Soldado are numerous collections of houses fast closing into villages, such as Papayal on the river, a rambling group of 100 houses. To the north is Guacanal, a hamlet of 60 houses, also Pozo Hondo, another with 50 houses. Further still Hato Nuevo and El Pozo adjoining, while nearer to the river is Caricoli, all deriving a livelihood from cattle and goats. These thrive wonderfully well, and their skins are a great source of wealth; the exportation last year from Rio Hacha was nearly 200 tons, valued at 37,000*l*. Corazonal is merely a couple of corrals, but is important as the highest point that can be reached in a canoe from Rio Hacha, owing to a small fall of rocks here. Soldado, a miserable little village 20 miles from Barrancas, eight miles west of the river, and 30 miles from Rio Hacha, capital of the national Goajira territory and residence of the Prefect, Chief Justice, Attorney-General, Syndic, Director of Schools, with their respective secretaries and various other leeches paid out of the national fund. It is a general trade-mart for the Indians, as no Colombians venture the other side of the Rio Rancheria. Moreno, formerly a village on the Spanish cart-road into the interior, has been abandoned on account of its dangerous neighbours. The same with respect to the two old villages of Boquerones and El Paso. Rio Hacha, founded in 1545 by French corsairs, has had a very chequered existence; burnt and pillaged time after time, it has always managed to rise from its ruins and flourish in spite of its adversities. Once it was an important place through the pearl fisheries; on these being destroyed, it still held an advantageous position for trading with the interior and the Goajira Indians. It has greatly improved these last two years and its commerce is quite brisk again. Generally ten or twelve schooners and three or four ships lie at anchor in the bay, and the custom-house dues collected here rank third in the republic. No town labours under more natural disadvantages; built on a low sandy shore, the ships have to lie miles out at sea, and during the busy six months of the year, a heavy surf all the afternoon makes loading and unloading impossible. Behind the town an immense plain stretches to the foot of the hills near Treinta, covered with cacti and a few scraggy trees only; thus in the dry season the poor animals that bring produce from the interior suffer great thirst, often three days without water, while in the wet season numbers perish in the mud while crossing the hills between Treinta and Chorera.

Returning to the rivers flowing into the Caribbean Sea, the next along the coast of any importance is Rio Camarones, draining the northern side of the easterly spur of the Nevada. We have already seen that the Rio Rancheria drains the southern flanks. This river has, on account of its many windings and numerous names, often been mistaken for a large tributary of the Rancheria. It is better known under the name of Rio Treinta, from the old little town Treinta, or Tomarazon, the principal village on its banks. Further north we have the cattle corrals of Palma de Maria, and crossing the river on the old high-road Cotopris, once of much importance, but now superseded by Barbacoa, a village that has sprung into existence, since my arrival in the country, to supply the caravans passing to and fro to Rio Hacha with maize and food; it counts over 100 houses. The inhabitants of this place with Pereverito and Pantano own large pastures, where cattle brought from Valle Dupar and San Juan rest and are fattened, previous to their journey to Rio Hacha, *en route* for Cuba. A mile before the river flows into the lagoon Navio Quebrado is the small fishing village of Camarones, a great health resort of the townspeople of Rio Hacha Next follows the Rio de la Enea, one of the most formidable rivers along the coast; it has a narrow, deep channel, powerful current, and is infested with caymans. Rio Dibulla, another good-sized stream, springs from Mount Chirua, the sacred mountain of the Arhuacos; its sands are highly auriferous, and I believe would pay working for gold. At the mouth is the small seaport of Dibulla, and a large sugar plantation, the only one in the State driven by steam. Rio Cañas also springs from Mount Chirua, and like most other rivers in this country has a different name to each section, in fact, these rivers have more names than mileage. The sources are called Rio Santa Clara and Quebrada Andrea, these united, Rio Volador, and nearer the coast Rio Cañas. The banks of the navigable portion are cultivated by the inhabitants of Dibulla, and are the market gardens of Rio Hacha, the plantains, cassava, &c., being conveyed every few days in large canoes. The next river of any importance is Rio Ancha. On its upper course are the seven Indian villages of Macotama, Taquina, San

Miguel, Santa Cruz, Santa Rosa, San Antonio, and Pueblo Viejo. This latter place, formerly the site of the San Antonio Indians, who abandoned it to remove higher up the valley across the river, is again springing up through the emigration of several families from Rio Hacha. It is often mistaken for the other Pueblo Viejo on the Ariguani, already mentioned.

Some years back a French emigration was essayed on the Quebrada Andrea, on the road to San Antonio; owing to the inability of the promoter, and his choosing a singularly unhealthy spot, it had to be abandoned. All this side of the Nevada, in spite of the apparent advantage of seaports, is not adapted for strangers, on account of the luxuriant growth and charming variety of insect pests, most of which are scarcely known on the other side. Besides, the place is very unhealthy through the broad plain extending between the hills and the sea, formed no doubt by the silt and granitic debris brought down by the many rivers, and gradually encroaching on the sea. In summer the smaller rivers, being choked up at their mouth by sandbanks, throw back their water on the plain, forming stagnant lakes to breed disease. In winter it is one large shallow lagoon. Now follow Rio Negro and Rio Palomino with an almost deserted village. This place was so inaccessible that the Prefect of the Nevada, not being able to visit it, induced the Indians to found Santa Rosa in 1875. They keep all their corn and animals up in the old place, however. A similar case occurred on the Guatapuri, when the Indians of Curiva built San José near Atanques. We now come to Rio Achiote, the deep and dangerous river of Don Diego; then the path crosses the rivers Buritaca, Goachaca, and Mininguaca, through groves of oranges and cacao, remnants of abandoned settlements. Here the path leaves the sea-shore, for the Nevada, throwing out a branch, forms a rugged precipitous coast, full of peculiar rocky bays, islands, &c., terminating in the Cabo de la Aguja or Needle Point. Two rivers wind their way through these mountains, clothed in a tropical foliage that the sun never penetrates, the Rio Naranja, so crooked that the path crosses it seven times, and the Rio Jordan.

Turning the point, on the western coast we have the Rio Manzanares, a small stream from the mountain of San Lorenzo. At its mouth is the town of Santa Marta, founded in 1525 by Rodrigo Bastidas, and therefore one of the oldest towns in America. The capital of the Magdalena State, it is beautifully situated in a large plain surrounded by high hills, on one of the finest bays along the coast. This city is very different to all other places in the State, with a large and really beautiful cathedral, the finest custom-house in the whole republic, a splendid market-place, and the most beautiful cemetery in the country. The harbour is the best in Colombia, of easy access, well sheltered, and deep enough for the largest vessels afloat. Vegetation is luxuriant, and the town is surrounded by gardens and delightful walks. In the old plantation of San Pedro, a mile from the town, Simon Bolivar, the great South American general and founder of five republics, died in 1830. In the vicinity of Santa Marta are numerous small villages which, although named after the various Indian tribes found here at the time of the conquest, retain little more than the name of their red-skinned ancestors, such as the fishing villages of Taganga, Mamatoco, Bonda, and Masinga, on the Manzanares, and Gaira, situated six miles distant along the coast. Near Masinga are some very interesting remains of an old road, said to be Indian, and to lead into the interior. The slabs of granite are wonderfully put together, of immense size, and follow up and down hill over a mile, terminating in a gigantic staircase. The road again appears near the old Indian village of Jiro-Casaca. Another similar road, but on a much smaller scale, led from Santa Marta to Minca, an old coffee plantation on the river Gaira; remnants of it are still in good preservation, and worked in for the new road. Negro slaves are said to have made this last one.

Last year I made an attempt to cross the San Lorenzo, to see what lay between it and the Nevada. After three days' knocking about in the densest of woods, the only guide I could obtain fell sick with fever, so, nearly eaten up by ticks, I had to beat a retreat. Between Santa Marta and San Juan de la Ciénaga the three small rivers of Gaira, Papares, and Cordova, all flowing from the San Lorenzo mountain, complete the series of rivers flowing into the Caribbean Sea from the Sierra Nevada. Near the latter river, and on the sea-coast, lies "la Ciénaga," a town of about 7000 inhabitants, and the largest in the State. Within a mile, on a narrow tongue of land, is its port, the little fishing village of Pueblo Viejo, with a water frontage on the great lagoon and on the sea. This town is intimately connected with Santa Marta, as most persons there have plantations on or near the Rio Cordova. Business is again reviving here, owing chiefly to the plantations spreading along the high-road to Valle Dupar, and the impulse given to tobacco-growing. There is also easy and constant communication with Barranquilla through the many lagoons and channels formed by the backwater of the river Magdalena.

The Ciénaga Grande receives the whole western watershed of the Nevada in two large rivers. The first, or Rio Frio, is composed of the Rio Frio and Rio Sevilla, both large streams, uniting a few miles before entering the Ciénaga. In between these rivers are several minor tributaries; the best known is the Quebrada Arihueca, through being figured on Codazzi's map as a large river. Along the high-road from Santa Marta to Valle Dupar, small settlements are springing up rapidly, especially round the fording places of rivers. Thus the village of Rio Frio, started six years ago for tobacco-growing, counts now 1000 inhabitants. At Arihueca are large cacao plantations; at Sevilla, Indian corn and plantains are grown for Santa Marta. Gold abounds in the sand of the Rio Sevilla, and large deposits of copper exist along its banks. The second is the Rio Cataca, or Aracataca, already mentioned in the ascent of the Nevada; it is, however, now enlarged by two tributaries as large as itself, the Rio Tucurinca on the north, and four miles lower down, on the south, the Rio Fundacion. Most of the canoes used by the fishermen of Pueblo Viejo and the adjacent island of Salamanca are made on the banks of the Tucurinca, and at the ford they have commenced a small village of the same name. Cataca is another village where several large plantations are commenced. The Rio Fundacion, or San Sebastian, is navigable as far up as the ancient and now ruined village of La Fundacion; its banks are rich in fine large cedars and lignum vitæ. Near its source in the Nevada is the small Indian village of San Sebastian de Rábago, founded, I believe, by a party of Spaniards from Bogotá for the cultivation of wheat, for which purpose this large and beautiful valley is through its elevation (about 6500 feet), and consequent temperate climate, well adapted.

The massive granite millstones lying about show that at least three mills were at work; of one, the masonry and water channel from river still remain. By opening out a road down the river to the village of La Fundacion, Santa Marta might be reached in two days, and for emigration purposes, this certainly offers the best locality. Very little is known about these rivers, as they come from an inaccessible portion of the Nevada, and in the plains flow through impenetrable forest. The road between La Fundacion and Camperuche is now almost deserted, except by cattle drivers; it usually requires two days and a half to traverse, and there are no houses or signs of habitations anywhere. It is the only place in the State where the night has to be passed out in the open. The path is across flat country, covered with virgin forest, till it crosses the Ariguani; then it enters an outspur of the Nevada, gradually rising to Alta de las Minas, where copper again is very abundant, to descend over many small hills to the cattle corrals of Camperuche. Numerous streams flowing into the Ariguani are crossed. There is another small river that drains this low range of outlying hills, independent of the Ariguani; it is, I believe, the Arroyo Caravallo, entering the Caña Ciega, near Medialuna. This finishes the rivers of the Sierra Nevada.

In conclusion, I may remark that the people are all exceedingly courteous, quiet, and orderly, though rather lazy. Their chief occupation is coffee and sugar planting, the distilling of rum, and the breeding of cattle, the same person often performing a little of each. Everybody has an inveterate love for barter, often buying and selling for the mere love of the thing. Unbounded hospitality is practised throughout the whole country; this is, of course, necessary where hotels and country inns are unknown; still a stranger is rather surprised to find himself treated with the very best, as an expected and honoured guest, at every house he chooses to stay at. With regard to firearms, the only persons who require them are those that, mixed up in politics, have made many personal enemies. Travelling is perfectly safe. I myself have tramped on foot or on horse every road in the State over and over again, at all hours of the day and night, usually alone and always unarmed, without the slightest fear; nor have I ever heard of any one being molested.

Rio Rancheria and its Affluents.

North or Nevada side.

1. Arroyo de la Boca de la Rosa.
2. „ Mamon.
3. „ Masato.
4. „ de Pozo Hondo.
5. „ de Papayal.
6. „ de Paladine.
7. „ de Agua Blanca.
8. „ de Ojo de Caro.
9. „ Soldado.
10. Quebrada de Moreno.

South or Andean side.

1. La Quebrada, with three small tributaries, Arroyo Guanabano, Corraleja, and Cañaboba.
2. Rio Palomino, or Rio Salado.
3. „ Cerrejon.
4. Waters of the Laguna de Garrapatero.
5. Arroyo de Tabaco.
6. „ Bruno.
7. „ Unknown.

Rio Cesar and its Affluents.

West or Nevada.

1. Rio Junta.
2. „ Badillo.
3. „ Seco.
4. Guatapuri.
5. Rio Azucarabuena.
6. „ Mocho.
7. „ Sambapalo.
8. „ Aguas Blancas.
9. „ Pesqueria.
10. „ Maria Angola.
11. „ Diluvio.
12. „ Garupal.
13. „ Guaimaral.
14. „ Canoa.
15. „ Ariguani.

East or Andes.

1. Arroyo Noguera.
2. Rio del Molino.
3. „ de Villanueva.
4. „ de los Quemados.
5. „ Quiebra-palos.
6. „ de Urumita.
7. „ Marquezote.
8. „ de Pereira.
9. „ de la Paz.
10. „ Chiriaimo, or San Diego.
11. „ del Jobo.
12. „ de la Puente.
13. „ del Espiritu Santo.
14. „ Sicarare.
15. „ Candela.
16. „ Casacará.
17. „ de Becerril.

Mr. C. R. Markham said he had listened with pleasure to Mr. Simons' paper, as the Sierra Nevada of Santa Marta was a region in which he had long taken a very great interest, owing to its having been the scene of one of the most remarkable episodes of the early Spanish conquests in America. When Charles V. wanted to colonise Venezuela, and to discover El Dorado, which was supposed to be a kingdom teeming with gold, in the very centre of South America, he made a grant to a powerful mercantile house, the Velsers of Augsburg, of the whole country from Rio Cesar to Marcapana and as far to the south as they could conquer. They sent out a German adventurer named Alfinger, who landed at Coro, and at the head of about 200 Germans and Spaniards, with a great army of Indians, marched down the valley of the Cesar until he came to the junction of the Magdalena. There he found a people so enormously rich in gold that he loaded a number of his Indians with it and sent them back to Coro with an intimation that he should remain where he was until he received further supplies. He waited in that region for a whole year, but no one came; his people began to die around him, and then he commenced his return march. He described the country upon which he afterwards entered as being very lofty; stating that the cold was so intense that great numbers of the Indians and even the Spaniards were frozen to death; and afterwards he came down upon an intensely hot tropical valley in which he died. He seemed to have marched right across the Sierra Nevada and down to the valley on the other side. The whole narrative is one of the most extraordinary stories in the history of those wonderful Spanish expeditions into South America during the sixteenth century, which could not be thoroughly understood without having the topography of the country clearly before the student, in such a way as it had been described by Mr. Simons. It would appear from the paper that the vegetation of the Sierra Nevada was entirely distinct from that of the Cordillera of the Andes. Mr. Simons had stated that the cinchona bark was found on the Sierra Nevada, but he (Mr. Markham) believed there was some mistake upon that point. Mr. Karsten explored those mountains, and described a number of cinchonaceous trees, which did not belong to the true cinchona genus, and Baron Humboldt observed with great surprise the same thing in the mountains of Mexico, which were also separated from the Andes, by the lower range of the Panama Isthmus. There he found the same trees and plants that surround the cinchona trees in the Andes, but no cinchona, which seemed to be exclusively confined to the Andes, and not to grow even in the Sierra Nevada, which was so close to it. He would like to ask Mr. Simons whether he had heard of any coca cultivation in the Sierra.

Mr. **Simons** said the coca was grown in large quantities by the Arhuaco Indians at a place called Templado, and sent down to sell to the Goajira Indians in exchange for rum and shells.

Mr. **Markham** asked whether there was any trace of the Taironas, one of the most warlike tribes ever known in South America, who, after several battles, drove the Spaniards back to Santa Marta; or whether they had been wholly exterminated.

Mr. **Simons** said the Tairona Indians had, according to report, been completely exterminated, and replaced by tribes said to have come from the Orinoco. The Goajira Indians, of whose regions very little was known, were supposed to be an offspring of the Tairona Indians; they were under the supposed tutelage of the Colombian republic, but managed to have pretty well their own way, and there was not a Colombian who would enter their territory for any money.

Mr. P. L. **Sclater** said there was one point of great interest with reference to the zoology of the Sierra Nevada. It would naturally be supposed that the birds and other animals would be the same as those of the opposite range of the Cordilleras of the Andes, which were certainly not a great many miles distant. Accurate examination, however, showed that that was not quite the case; for the Sierra Nevada was tenanted by a certain number of peculiar species of birds. He had had the pleasure of examining the collection sent over by Mr. Simons. There were examples in it of four or five species of humming birds which were peculiar to the Sierra Nevada, and also of a certain number of birds of other families. It was quite evident, therefore, that the Sierra must be very old in formation. This fact also gave some countenance to the views put forward by Mr. Simons, that the Magdalena formerly flowed down on the right-hand side of the Sierra Nevada, the Sierra itself being, if not an island, yet more perfectly separated from the main range of the Cordilleras than at present. He did not know whether Mr. Simons had collected plants, because, of course, that might throw fresh light upon the subject.

Mr. **Simons** said he made a small collection of plants from the snowy region of the Sierra Nevada, but timber there was so excessively scarce that there was little or no forest above 5000 feet; so that heating was almost out of the question, and the climate was so moist that out of three large collections of plants only a few hundreds could be sent over to Europe. These were at present in the hands of Dr. Carruthers of the British Museum, but he did not know that they had yet been classified.

The **President**, in returning thanks for the paper, said that he had been rather puzzled to recognise the name of the region in which Sierra Nevada was placed. He was comforted to hear from Mr. Simons that during the course of his life the country had borne seven different names, and that that part with which he had been familiar in his youth as New Granada had at last, after many changes, reposed finally in the name of Colombia.

Steppe Routes from Karshi to the Amu-daria. By E. Delmar Morgan.

To the following version of "Steppe Routes from Karshi to the Amu-daria," in the *Isvestiya* of the Russian Geographical Society, by M. N. Maief, the well-known editor of the *Turkistan Annual*, I have ventured to add a few explanatory notes, taking such liberty with the text as may, without deducting from the value of the original, render it more readable to Englishmen.

Of shifting sands much has been said and written lately; Sir Douglas Forsyth, Colonel Prejevalsky, and other travellers of note have come across them in different parts of Central Asia, and they have been fully described in our own 'Proceedings.'* But there is one thing which M. Maief's article brings to mind, and that is the want of vigour on the part of the administration of Turkistan in arresting the process of decay now going on in that country. With the exception of Verny, which under General Kolpakofsky's auspices is assuming a somewhat European appearance, very little has been done in the way of public works. I certainly heard that a canal was being cut across the "hungry steppe," but have no means of knowing what progress has been made with it. In such a climate, on such a soil where trees grow with extraordinary rapidity, it might surely be possible to convert some of these wildernesses into fruitful places. Mention is made in the following pages of the military expedition to Charjui on the Amu-daria last year. This is the first notice of it that has appeared in any Russian official publication to which I have access. But it may be useful to remind our readers that the detachment sent by this way was intended to help in the reduction of the refractory Turkomans, and, if I am not mistaken, it was commanded by Colonel Kuropatkine of Kashgar fame, whose desire to take a leading part in every stirring event was thus apparently gratified.

M. Maief's paper is as follows:—

From two great centres of Central Asia, Bokhara and Karshi, the following routes lead across the steppe to the Amu-daria:

1. From Bokhara to Charjui, with branch from Kara-kul to Fort Osta.
2. „ Karshi to Naruzima.
3. „ „ Burdalyk.
4. „ „ Kerki.
5. „ „ Kelif.

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* Vol. xxi. p. 27 *et seq.*

The first of these, from Bokhara to Charjui, with its branch to Osta, was surveyed in 1876 by Major Cherniafsky, and was taken by Russian battalions last year [1880]. It will, therefore, be unnecessary to include it in this article, or that from Karshi to Kelif viâ Huzar, also surveyed by the same officer.

The route from Karshi to Naruzima is one of the worst, owing to the brackish water contained in the wells situate along it. The next of the series, however, that from Karshi to Burdalyk, is very different.

Let it be first observed that the chief obstacle to traffic arises from belts of shifting sands, which extend from the Aral Sea to the Kerkitchi-tau, as the mountains near Kerki are called. This sandy tract, widening towards the Aral and gradually diminishing in breadth towards the east, is doubtless caused by prevailing north-easterly winds blowing with extraordinary violence for six months in the year. In this way a sea of sand-dunes is formed, extending from north-east to south-west, advancing from the north-eastern border of the steppe to the lower Amu-daria, and gradually encroaching upon and silting up this river. These constant north-east winds may be compared with the monsoons of sub-tropical regions, and are caused by the heating of wide tracts of sandy desert lying south and south-west of the Oxus. As the hot air ascends, following the invariable law of nature, colder currents from the Kizil-kum on the north rush in to supply its place. After sunset the heated surface of the sand cools rapidly, the wind drops, and by midnight it is quite calm. The zone of these steppe "monsoons" is bounded on the north by a line passing through Karshi and Bokhara, continued in the same direction to the Aral Sea, so that our Turkistan soldiers experienced their full force during the Khivan campaign of 1873. On my recent expedition I twice crossed the belt of steppe subject to their influence, and noticed that the further east and north-east I went, the more they diminished in violence. If report speaks true, at Kerki ferry the right bank of the Amu-daria is margined by an inconsiderable extent of sand-desert, but having had no opportunity of personally visiting this tract, I rely entirely upon information derived from native guides, who deny that there are sand-hillocks in that quarter; moreover, *arbas*[*] pass that way. Further west again, along the Burdalyk road, these sand-dunes are higher but cover a belt only 10 to 15 miles wide, whilst south of this they only occur sporadically and at rare intervals, being overgrown with a variety of bushes, and presenting altogether a different aspect.

Between Karshi and Naruzima the belt of shifting sands is three *tash*[†] (18 miles) wide, whilst between Bokhara and Charjui it is but seven miles, the lower Zerafshan dividing it here into two parts. West of this, beyond the Charjui road, the desert has completely gained the mastery. It was this section in its widest part, between Kala-ata and Utch-Utchak, that detachments of Turkistan troops crossed diagonally on the way to Khiva in 1873.

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[*] *Arbas* are native carts on high wheels.—[All the footnotes are by E. D. M.]

[†] *Tash* are native milestones; the word is used for measuring long distances, and in this sense is equal to the Persian *farsang*, or about six English miles.

As already stated, outside the belt of shifting sand-dunes lies a zone of steppe, interrupted by occasional saline tracts seamed with low ridges and hillocks of sand. These, however, are stationary, being knit together by a poor, stunted kind of vegetation, whose roots take firm hold of the yielding soil and prevent it drifting with the wind, which here only removes the lighter particles on the surface, leaving the heavier to be moulded by time and weather into a compact mass. North of this region lie saline argillaceous plains, supporting a scanty vegetation of wormwood and prickly bushes, with saline herbs in the marshes, a tract not unlike the Chinaz-Djizzak "hungry steppe." All these three belts have to be crossed on the road from Karshi to Burdalyk: thus, between Karshi and Alang wells, lies a zone of saline argillaceous earth wholly free from sand; between Alang and Tash-kuduk are stationary hillocks of sand, salt marshes, and gravel, and lastly, between Tash-kuduk and Burdalyk, the whole distance of 10 to 15 miles is filled in with shifting sands.

These prefatory remarks are necessary inasmuch as they apply generally to the tract between Karshi, Bokhara, and the Amu-daria, and may also serve to explain other routes leading to this river. All of them cross the three zones, the saline clay, the sand-hillocks, and the shifting sands, the difference between them consists in the number of wells and distance between each, and especially in the width of the belt of quicksands crossed. With these prefatory remarks let us proceed to consider the route from Karshi to Burdalyk.

1st stage, Karshi town to Shirin-djui hamlet,* 14 *miles.*—Road lies through arable land abundantly supplied with good drinking water stored in covered wells. The irrigating dykes are only flooded when the Kashka-daria overflows its banks at the end of May or early in June, not often earlier. The inhabitants are therefore obliged to dig wells. The following hamlets are passed in this stage: Mitan, four versts from Karshi, strictly speaking at the end of the gardens of this town; Kalla-Kurgan, four versts from Mitan, half-way between them is a roadside well with two mulberry trees growing beside it. The water in it is slightly tainted, and may be unwholesome owing to the immediate proximity of a large cemetery, but there are other wells in the hamlets Kalla-Kurgan and Hódja-Kurgan; six versts from the former is the hamlet of Zar-Kunak, and seven versts beyond it Shirin-djui.

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* Shirin-hatun was a beautiful queen whose romantic story is told by Schuyler, 'Turkistan,' i. p. 108.

2. *From Shirin-djui to Denau*, 14⅔ *miles.*—The road, similar to preceding march, passes at three versts from Shirin-djui the hamlet of Chim-Kurgan, and seven versts farther the much larger one of Kazvi, with a *kurghan* or walled enclosure. Twelve versts beyond Kazvi lies Denau, a large hamlet where the *amliakdar* has his residence. Between Kazvi and Denau cultivated alternates with waste land, the latter supporting a prickly kind of bush.

3. *From Denau to Alang Wells*, 12 *miles.*—Road crosses level plain; six versts from Denau, Chandyr is reached, and two versts farther a solitary hut standing in the midst of arable land. Between Denau and Chandyr the road lies through cornfields and melon plantations; beyond Chandyr it passes over a saline rolling plain. Alang is the name given to a group of wells surrounded by a low mud wall with trough for watering cattle. These wells are lined with brick and contain excellent water. Their depth is 130 feet, and vessels are lowered into them by means of a rope passing through a block.

4. *From Alang Wells to Sardoba Chil-gumbez*, 12 *miles.*—The country is undulating steppe with ridges of sand overgrown by a few characteristic plants such as *djuzgun*. Here one begins to feel the *Garmsir*, a hot, suffocating wind which blows during the summer months —May to August—with great violence, always from the north, and usually beginning between nine and ten in the morning, attaining its full strength by two in the afternoon, and falling after sunset. Towards sunrise the temperature of the air becomes pleasantly cool, and between 2 A.M. and 10 A.M. is the most convenient time for exercise. This wind is not originally fever-laden, as Vambéry and other travellers have described it; it is in passing over marshy tracts and rice plantations that it becomes so. Thus at Charjui it is very noxious owing to the miasma it brings from Bokhara and the lower Zerafshan, whereas before reaching Bokhara it is pure and bracing, supplying fresh air from the depths of the Kizil-Kum, and scattering the noxious vapours of Bokhara and Kara-Kul.

Sardoba Chil-gumbez is a fair type of the conical buildings erected to store snow-water for use in summer. It stands in a small hollow and is carefully built of baked bricks. The steps leading down to the water have all been broken and the descent to it is now very steep. In order to prevent horses, sheep, and camels from falling into it, a low mud wall has been built across the entrance and no cattle are ever admitted inside the enclosure that its waters may not be polluted. We found this excellent at the end of August. Every winter Illebai Turkomans, nomadising in these parts, fill the cistern to the brim with snow, which thaws and remains pure throughout summer, an unusual circumstance in open stagnant pools.

5. *From Sardoba Chil-gumbez to Tash-kuduk Well*, 16 *miles.*—The first part of the road lies over hard, gravelly, and slightly undulating

soil with ridges of sand; further south is a tract of saline clay with its usual scanty vegetation. Sixteen versts from Chil-gumbez cistern the zone of stationary sand-hillocks begins. Here is Massa-kuduk well, with brackish water though fit for horses and cattle. In spring nomadising Turkomans rendezvous here before migrating to their summer camping-grounds near Burdalyk and the banks of the Amu-daria. Eight versts farther, on level ground, in the midst of sand-hillocks, is Tash-kuduk, also a brackish well though eagerly drunk by horses. Indeed, all water in these wells is more or less bad; on digging deeper, however, into the subsoil, below the sand, good water may be obtained, and this is what all Turkomans and travellers have to depend on; just as our men did at the famous Adam-Krilgan* wells, the surroundings in both cases being very similar.

6. *From Tash-kuduk to Burdalyk*, 16 *miles.*—This march resembles the last. The road winds through loose sand-hillocks bare of vegetation except a few bright green patches of feather grass, not readily eaten by horses. These sand-hillocks, it may be remembered, take the crescent or horseshoe form, the side facing the wind being abrupt, whilst the opposite slopes gradually off. The road avoids their summits because of their steepness. Hot winds are as prevalent here as in the preceding belt.

Sixteen versts from Tash-kuduk stands another well, Baigrish-kuduk, with some others at a little distance off the road, subsoil water being everywhere procurable. Near Baigrish-kuduk there is a salt-marsh about two versts long, entirely free from sand, hillocks of which continue beyond it to the turning of the road to Naruzima. At the end of this stage some tall poplars (*Populus diversifolia*) and good-sized tamarisk bushes may be seen, the latter half buried in sand. The constantly diminishing belt of cultivated land on the northern bank of the Amu-daria is apparently destined soon to disappear altogether under sand-drift. The inhabitants of Bashkaul,† eight versts from Burdalyk, told M. Maief that in the course of four years they would have to abandon their homes and move elsewhere, for their land was being steadily encroached upon in two ways, on the north-east by sand, and on the south by the river washing portions of it away. A change, adds M. Maief, which is taking place along the whole extent of habitable land on the right bank of the Amu-daria.* Its left bank, however, is being swept clear of sand by the same wind which is doing so much mischief opposite (an apt illustration of the old adage, "It's an ill wind that blows nobody good"). Here the area of land fit for cultivation is extending, and forms one continuous strip, unbroken by those wide sandy tracts of such frequent occurrence on the right bank, where the steadily advancing sea of sand threatens to blot out all remaining traces of culture and leave it a barren desert. Roads, caravanserais, wells, and cisterns may all be swallowed up, for there is no commercial intercourse to prevent their falling into decay. None but *djigits* or native guides in the Russian service, or the Turkoman with his flocks and herds, pass along the Karshi-Burdalyk road now-a-days. Not for them or their cattle were these roads made, these cisterns built, these wells dug. These works refer back to the time of Abdullah Khan † (1555–1597), second of that name, the wise and energetic sovereign of Bokhara and greatest of the Sheibanides. Three centuries ago these desolate tracts could not have been nearly so extensive as they are at present on the right bank of the Amu-daria, and a considerable trade must have passed that way.

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* Adam-Krilgan is a place of historic interest, for this was the turning-point of the last Khivan expedition. It was here that General Kaufmann's force was reduced to well-nigh desperate straits, when an offer of fifty roubles for a glass of water led to the accidental discovery of Alti-kuduk (six wells), four versts from Adam-Krilgan, and saved the expedition. The late Mr. MacGahan, in his admirable narrative, gives the meaning of the word Adam-Krilgan, "fatal to men." ('Campaigning on the Oxus,' &c., p. 129).

† Bashkaul, possibly from two Tartar words, *bash*, "head," and *aul*, "village," the whole word might then mean head-village; the *k* being introduced for the sake of euphony, a bit of etymology for which the translator is alone responsible.

The close approach of sand-drift is intimately connected with the question of turning the Amu-daria into its old channel, for it is obvious, as M. Maief says, that if conditions remain unchanged and the right bank be entirely covered with sand, the river bed will in time be choked up. Sedimentary matter borne down in such vast quantities and deposited in its lower channel would alone render futile any attempt to divert the stream. ‡

But to resume the consideration of the Karshi-Burdalyk road.

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* The tendency of the Oxus to cut into its right bank, commented on by more than one writer of eminence, has been attributed to Baer's law on the rotatory motion of the earth.

† Abdullah Khan was, according to Vambéry ('Hist. of Bokhara,' p. 284), styled "benefactor of his people," and has left much the same reputation as that of his contemporary Shah Abbas the Great in Persia; all useful works in both countries being generally attributed to these two sovereigns.

‡ When in Central Asia last year, I ascertained that the balance of opinion was against this project. General Kaufmann told me his reason for considering it impracticable was that an enormous quantity of water would be required to fill Lakes Sari-Kamish to a level sufficiently high to cause an overflow in the direction of the Usboi. But the late General Petrusévitch, who fell at Geoktepeh last year, after an elaborate survey of the delta and lower course of the river, was firmly convinced of its practicability. His idea was to connect the old and present beds by a continuation of the Déudan, a southern arm in the Khivan oasis, which is supposed to pass considerably to the south of Sari-Kamish Lakes and join the Usboi below these lakes. The more attentively these questions are considered, the more fully is one disposed to agree with the late Major Herbert Wood, R.E., who remarked:—"But if humanity and civilisation be not empty words, it behoves Russia to reclaim these deserts, the saltness of whose wells fills the heart of the Turkomans with anger and malice against all men."

Taking the sum of all the above stages, the itinerary appears to be as follows:—

Town of Karshi—	
Shirin-djui hamlet	21 versts.
Denau "	22 "
Alang well	18 "
Sardoba Chil-gumbez	18 "
Tash-kuduk well	24 "
Town of Burdalyk	24 "
	127 " or 85 miles.

the exact distance given by Burnes of his route from Kojah-Saleh ferry to Karshi, which he reached on the fourth day after crossing the Oxus, marching upwards of 25 miles a day. According to the route now described, Sardoba Chil-gumbez lies about half-way between Karshi and Burdalyk. Of the importance of the latter of these towns in former times, the great highway leading thither affords ample evidence. But little remains of the great works except the wells, solidly built of brick. Even the edifice erected over the entrance to the Sardoba has suffered greatly; and were it not for the Turkomans, who fill the cistern with snow every winter, it would also disappear under sand-drift, a fate that has befallen many similar buildings on the Chināz-Djizzak road.

The Karshi-Burdalyk road leads direct to Guriāsh, the centre of the Ersari Turkoman settlements. Here resides their elder, Tillia Toksabai, nominally vassal of Bokhara, but, for all that, an independent potentate. These Ersari Turkomans pay tribute to the Khan of Bokhara on 40,000 kebitkas, but their number is much greater; yet nothing further is required of them, and they are left to settle their own strifes and dissensions. The most influential of their elders, Tillia Toksabai, is on intimate terms with Abdurrahman Khan, and was invited by him to Cabul, doubtless with the view of coming to some arrangement in order to check the incursions of the Ersari into Northern Afghan territory. So far, these negotiations have not resulted in anything; for in the early part of the present year the Ersari raided to Andkhoi, and carried off numerous cattle, horses, camels, and prisoners. All these are held in expectation of a ransom.

Nor do the Ersari Turkomans suffer their allegiance to Bokhara, such as it is, to interfere with their raids upon the bekships of Naruzima, Burdalyk, and Kerki, included within Bokharian territory, and one of their serkars, Heldi-gok, has gained notoriety by acts of brigandage near Burdalyk.

If the Bokhara Government looks upon them as incorrigible, and does not attempt to control them, it knows, on the other hand, how to avail itself of their predatory instincts for purposes of its own; thus recently it invited them to harass the Tekkehs, and 600 of them, according to M. Maief, have gone on an expedition into their country. In this way the Ersari and Tekkehs are enemies, instead of uniting, as formerly, to plunder Persia.

Another very good road leads from Samarkand to Karshi viâ Djain and Kermina, whence its continuation is as follows:—

Kermina town—		
River Sypta (tributary of Narupai)	4	tash.
Yablu-kuduk	2	„
Arab „	2	„
Kassan hamlet	3	„
Town of Karshi	3	„
	14	„ or 112 versts = 75 miles.

The road is throughout level, and water is abundant. Yablu-kuduk and Arab-kuduk are groups of wells with good water. In conclusion, M. Maief gives the following itineraries:—

1. From Bokhara to Farab, crossing the Amu-daria opposite Charjui:—

Bokhara—		
Mazar-hosh-tiube	13	versts.
Hodja Islam ruins	2	„
Yak-tut hamlet	19	„
Shari-haiber ruins	10	„
Paikan hamlet	12	„
Kara-kul town	8	„
Hodja-daulat hamlet	16	„
Mazar-hodja-Yussuf	8	„
Salt marsh	20	„
Farab hamlet	12	„
	120	„ = 80 miles.

2. Direct road from Bokhara to Burdalyk (surveyed by Major Cherniafsky)—

Bokhara—		
Serai hamlet	7½	versts.
Kichik-ob well	57½	„
Tash-ahur well	20	„
Nakhta well	18	„
Tash-kuduk	23	„
Burdalyk	19	„
	145	„ = 97 miles.

3. Karshi to Naruzima (from Maief's hearsay information)—

Karshi—		
Shirin-djui hamlet	21	versts.
Denau	22	„
Alang well	18	„
Tali-pakta bitter well	32	„
Utch-oguz „	24	„
Naruzima	40	„
	157	„ = 105 miles.

4. Direct road from Karshi to Kerki (from Maief's hearsay information)—

Karshi—	
Nishan bitter well	3½ tash.
Sansulak ,,	6 ,,
Kerki town	4½ ,,
	14 ,, = 112 versts = 75 miles.

5. Road from Karshi viâ Kuzar to Kerki (Maief's hearsay information)—

Karshi—	
Yanghi-kent hamlet	3 tash.
Kuzar town	2 ,,
Kerkinchak well	4 ,,
Gurchak ,,	4 ,,
Sansulak ,,	2 ,,
Kerki town	4½ ,,
	19½ ,, = 156 versts = 104 miles.

GEOGRAPHICAL NOTES.

Mr. Leigh Smith.—Up to the moment of going to press no news has been received of our adventurous Arctic yachtsman. It is now thought by those whose experience of navigation in the Spitzbergen seas gives their opinion great weight, that it is probable he reached Eira Harbour in Franz-Josef Land in the month of July, the drift of the ice at that time being favourable, and that the pack afterwards closing in on the south, he has been prevented from returning. If this be the case no apprehension need be entertained, at least for the present, concerning him. The *Eira*, on starting from Peterhead, was furnished with provisions for at least fourteen months, the bread and flour being enough to last two years. Captain David Gray, of Peterhead, informs us that Mr. Leigh Smith took with him two sledges, with a quantity of gear for tents, and a wooden house capable of holding all his crew; he was prepared, therefore, for wintering and sledging northward in the spring.

Visit of the 'Thomas Corwin' to Wrangell Land.—Details of the Arctic voyage of the United States revenue steamer *Thomas Corwin*, commanded by Captain C. L. Hooper, have been received since our last issue. She left San Francisco on May 4th, on her regular annual cruise along the coast of Northern Alaska, and with instructions to search for the *Jeannette* Expedition, and also for the missing whalers *Vigilant* and *Mount Wollaston*. Passing through Behring Strait unusually early in the season, Captain Hooper proceeded to the northern coast of Siberia, and rounding Cape Serdze Kamen on May 21st, reached the Chukche village of Tapkan. Here he obtained news of the wreck of the whalers, and having procured sledges and dogs despatched Lieutenant Doty to examine the vessels, which were found near Cape North. After coaling at the newly discovered coal-mine near Cape Lisburne, on the Alaska coast, the *Thomas Corwin* started for Herald Island, which was reached on July 30th, and thoroughly examined, its summit proving to be a little over 1200 feet high. On August 12th the vessel, having forced her way through the barrier of broken ice, anchored less than a cable's length from the shore of Wrangell Land, opposite the mouth of a river. A party was landed, and found no snow remaining on the lowlands and hills, though remains of very heavy drifts were observed on the distant mountains. The river, named by Captain Hooper Clark River, was 75 yards broad and 12 feet deep, and had a current of three miles an hour. The party proceeded four miles inland, and saw slate-stone ledges and broken quartz rock; while from a high hill they traced the course of the river northwards for about 40 miles. Over twenty species of Arctic plants were found in bloom, and the flowers gathered and pressed. The place where the party landed was near the south-east cape in N. lat. 71° 4′, W. long. 177° 40′ 30″. Captain Hooper is of opinion that very rarely, if ever, is there any open passage from abreast of Herald Island to the east shore of Wrangell Land; the water is shallow, and solid ice appears to remain constantly frozen to the bottom. To the eastward of Herald Island, however, a long open passage of clear water extends northward as far as the eye can reach, the current setting steadily up at the rate of from one to three knots an hour. According to Captain Hooper, this passage appears like an ocean river running between fixed banks of ice, either frozen to the bottom or held in place by land on each side—Wrangell Land on the west, and an extension of Keenan's Land on the east—although the latter was too far distant to be made out from elevated places on Herald Island. It is stated that the *Jeannette* is known to have proceeded up this open channel, and Captain Hooper and others believe that she thus passed far towards the north the first season, without being able to approach Herald Island or Wrangell Land.—The *Thomas Corwin* was at Point Barrow on the Arctic coast of America on August 16th, when the ice was well off the shore and the point easy of access. She next proceeded to Plover Bay to coal, arriving there on August 24th, seven days after the *Rodgers*, under Lieutenant Berry, had left the place. At Plover Bay Captain Hooper found the *Golden Fleece*, which left San Francisco in the latter part of July, having on board Lieutenant P. H. Ray, U.S.A., and his party, who were on their way to establish the meteorological observing station at Point Barrow, and regarding whom we give further news in a subsequent note.* Captain Hooper generously gave them his entire outfit of reindeer clothing, which he had provided for himself and his crew in case his ship should be compelled to winter in the Arctic Seas. On August 25th the *Thomas Corwin* towed the *Golden Fleece* out of Plover Bay, and left her with a fair wind making straight for her destination, which Captain

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* At page 735.

Hooper expected she would reach in a short time, as the northern shore of Alaska was well clear of ice.—The *Thomas Corwin* left the Arctic Seas on September 14th, after an unsuccessful attempt to effect a second landing on Wrangell Land, and reached San Francisco on the 20th of October.—It may be interesting to note that, when in Kotzebue Sound, Captain Hooper explored a cairn on Chamisso Island, in which he found records of the British ship *Blossom*, September 1826, of the *Herald*, 1848, and of the *Plover*, 1849, to which he added the name of the *Thomas Corwin.* He also found the record of a Russian-American Company's expedition in 1838. Dwarf cranberries in great abundance were seen in this neighbourhood. At Elephant Point, where there are numbers of mammoth bones, Captain Hooper and Professor Muir searched until they found nearly an entire skeleton in good condition, besides the remains of an aurochs and reindeer. Captain Hooper afterwards landed on St. Lawrence Island to inquire into the circumstances of the wholesale starvation of the natives which occurred there in the winter of 1878–9, and which appears to have resulted from the action of whisky traders from Honolulu.

Visit of the United States Steamer 'Rodgers' to Wrangell Land.—In our August number* we announced the departure from San Francisco, on June 16th, of the *Jeannette* search expedition, in the United States steamer *Rodgers*, commanded by Lieutenant R. M. Berry, and we have since heard that she was at Plover Bay, on the Siberian coast, in the middle of August. By letters which reached San Francisco on November 7th, in the steam whaler *Belvidere*, we are now able to give some account of her subsequent proceedings. Lieutenant Berry arrived at Herald Island on August 24th, but no trace could be found of the *Jeannette*, and a record having been deposited on the cliff, the *Rodgers* left for Wrangell Land, the south coast of which was reached after passing through about 12 miles of loose ice, on August 25th. On the following day the vessel was anchored in a fine harbour, where she could remain in safety, while expeditions were engaged in exploring the interior and in examining the coast-line for cairns and other traces of the *Jeannette*. Lieutenant Berry himself took charge of the land party, which ascended a mountain some 2500 feet high. From this elevation they were able to see open water in all directions, except between the west and S.S.W., in which quarter a high range of mountains seemed to terminate the land. Mr. H. S. Waring, the master of the *Rodgers*, proceeded by boat along the eastern and northern shores until stopped by the ice which had been driven in by the northerly wind, and eventually he was obliged to abandon his boat and return by land to the ship. Another boat, in charge of Ensign H. Hunt, followed the western coast until it was stopped by the same ice which Mr. Waring met with. Ensign Hunt had passed the most northern point of Wrangell Land, and was able to see Mr. Waring's position, so that the whole coast-line may be considered to have been examined, and Wrangell Land proved to be an island. No trace of any human being having ever visited the island could be found, with the sole exception of the record left by the *Thomas Corwin* about a fortnight previously. The position of the harbour where the *Rodgers* was anchored is stated to be N. lat. 70° 57′, W. long. 178° 10′, and it is situated to the south and west of Captain Hooper's landing place at the mouth of Clark River. In her subsequent cruising the most northern point reached by the *Rodgers* was N. lat. 73° 44′, W. long. 171° 48′, on September 19th. According to a report received by the Navy Department at Washington, the *Rodgers* will winter in St. Lawrence Bay, and Lieutenant Berry intends to despatch a sledge party to examine the Siberian coast-line to the north and west.

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* See *ante*, p. 483.

The Arctic Cruise of the U.S. Steamer 'Alliance.'—The United States steamer *Alliance*, which was despatched during the past summer under the command of Captain G. H. Wadleigh to search for the *Jeannette*, returned to Halifax, Nova Scotia, on November 1st. Captain Wadleigh reported to the Navy Department from Reykjavik, Iceland, that he left Hammerfest on September 16th, and proceeded towards Spitzbergen, cruising under sail till the 25th, and getting as far north as lat. 79° 36′. On that date he started for Reykjavik, following the ice-limit as far as possible; he took observations on several occasions, and found the ice to extend far to the eastward of the ordinary limit. After September 20th the *Alliance* experienced a succession of gales, snow, sleet, and dense fogs, so that with the limited amount of coal and provisions on board, Captain Wadleigh did not think it safe to attempt to reach Cape Brewster, even if the ice, which in ordinary seasons extends from 70 to 130 miles from the Greenland coast, would have allowed of his doing so. His own observations and the information he obtained entirely confirm Captain David Gray's report * of the ice this year extending much further south than usual, and he adds that it was also much heavier. The Norwegian walrus-hunters who ordinarily go to Hinlopen Straits and even further on the north coast of Spitzbergen, did not this season get as far to the north and east as the *Alliance*. Wyde Jans Water, on the south-east, was full of ice, which extended from Hope Island nearly to Cape Petermann, Novaya Zemlya. Captain Wadleigh says that the southerly position of the ice is accounted for by the last very severe winter and the fact that during July and August the usual southerly winds did not prevail and force the ice northwards. During the voyage of the *Alliance*, careful search was made for drift-wood on all possible occasions, and fishing vessels were communicated with and furnished with a description of the *Jeannette*, but no intelligence of any kind was obtained respecting her. Botanical and zoological collections were made by the officers of the ship, and the temperature and specific gravity of the sea-water noted every two hours.

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* Vide 'Proceedings,' present number, p. 740.

American Polar Station at Lady Franklin Bay.—Lieutenant Greely, the commander of the station, after his arrival, sent the following message to be telegraphed from St. John's, Newfoundland. The message left Lady Franklin Bay August 18th, and was telegraphed from St. John's, September 19th:—"Entered Lady Franklin Bay one month from leaving St. John's. Obtained natives, skin clothing, and dogs at Godhaven, Rittenbank, Upernivik, and Proven. Made most remarkable trip recorded, from Upernivik through middle passage to Cape York in thirty-six hours. In six days and two hours from Upernivik, though delayed thirty-two hours by fog, entered Lady Franklin Bay; having meanwhile examined English depôt, Cary Island; recovered entire English Arctic Mail at Littleton Island; discovered transit instrument, *Polaris* quarters, Lifeboat Cove; obtained record Washington Irving Island, overhauled English depôt, Cape Hawks, and landed depôt at Carl Ritter Bay. Vessel never met pack worthy of name, or stopped by ice, until inside Cape Lieber, Lady Franklin Bay, eight miles from destination, where delayed one week, being forced back south of 80th parallel. Entered Discovery Harbour August 11th, where station is located, Watercourse Bay being impracticable for landing. About 140 tons coal landed. Have killed here full three months' rations musk cattle. Weather fine. Building framed, and being covered. Party all well."

United States Meteorological Station at Point Barrow.—The expedition * which was organised by the United States Signal Office for the establishment of a Station at Point Barrow for meteorological, magnetic, and other observations, left San Francisco about the end of last July, in charge of Lieutenant P. H. Ray, U.S.A., on board the *Golden Fleece*, and, as recorded on a previous page, was met at Plover Bay on August 24th by Captain C. L. Hooper, of the *Thomas Corwin*. The *Golden Fleece* returned to San Francisco on November 5th, and her master, Captain Jacobson, reports that on September 17th he left Lieutenant Ray and his party at the station, which is called Ooglalamie, five miles west of Point Barrow. The observatory had been put up before he left, and the construction of the main building was begun. As soon as possible next spring Lieutenant Ray intends to commence an exploration of the valley of the Coppermine River, which he believes to have some connection with the Yukon, and afterwards make for Kotzebue Sound, where a vessel will be waiting for him with supplies.

Longitude of Stanley Pool on the Congo.—Mr. Stanley ascended the Congo to Stanley Pool in the month of July last, and took a series of observations to fix the longitude of the place. The result has been announced as 15° 47′ W. In the map illustrating Mr. Stanley's original journey down the Congo the longitude is 17°. Messrs. Crudgington and Bentley, on an estimate of the distance travelled,* in their journey last February, judged the longitude to be about 16°. The result of the altered position is to shorten the length of the river obstructed by the Yellala and other falls and rapids by 73 miles.

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* See *ante*, p. 484.

Mr. Schuver's Journey in Central Africa.—We have received news direct from this adventurous traveller, by letter dated the 12th of July last.† He was then at Fadassi, 4500 feet above sea-level, in the Berta country south of the Blue Nile, in lat. 9° 45′. Up to this point he had followed pretty nearly the track of the explorer Marno in 1870–71; but beyond Fadassi lies a *terra incognita*, which he was getting ready to penetrate in the approaching dry season. To the south or south-west a lake or group of lakes were reported to exist. He had narrowly escaped death by fever at Fadassi, to which his faithful companion the Italian, Giacomo Rachetti, had succumbed. He has sent his observations for the latitude of Beni-Shongul to Mr. Coles, under whom he had taken lessons before starting.

The new Russo-Chinese Frontier in Central Asia.—By Article VII. of the Treaty of St. Petersburg, which has lately been ratified, it is provided that the frontier-line between the Russian possessions and the Chinese province of Ili from the Bejintao Mountains, shall follow the course of the river Khorgos (Khargos) to its confluence with the river Ili. Crossing the river it will run in a southerly direction towards the Uzuntau Mountains, leaving the village of Koljat on the west. From this point it will follow the line to the south which was fixed by the protocol signed at Chuguchak in 1864, the consequence being that from Koljat down to the Tien-Shan the *old* frontier remains unaltered, and the Marquis Tsêng has thus recovered for China the Muzart Pass and the whole of the Tekess Valley, which had been ceded to Russia by Chung-How.—By Article VIII. it is arranged that, in consequence of a portion of the frontier-line to the east of Lake Zaisan, as fixed by the Chuguchak protocol, having proved defective, it shall be modified by a joint commission. The new line is to run between the old frontier and a straight line drawn from the Kuitun Mountains across the Cherny Irtysh to the Saur Mountains. Article IX. provides for the delimitation of the Ferghana-Kashgarian frontier on the basis of that hitherto existing.

Old Map of Djungaria.—The Imperial Russian Geographical Society announces the discovery of a very curious map of Djungaria constructed before the year 1733. Up to the period of Atkinson's travels in Eastern Siberia very little was known by the Russians of the country of the Ili. In the year 1836 Klaproth published in Paris his map of Central Asia, and that preserved its value up to the time of the Russian conquest of Turkistan and Ferghana. During the period between the years 1864 and 1876 Russia became firmly established in Asia, and since then she has accumulated abundance of data on which day by day Klaproth's work has been rectified. Klaproth had long been the sole authority on the subject of the geography of Central Asia, and yet there existed all that time a map of which no one had any knowledge. By a curious and inexplicable concatenation of circumstances this document of intrinsic merit remained ignored, and was never utilised.—Jean Gustave Renat, serjeant in the Swedish army, was taken prisoner at Poltava, was interned at Tobolsk, and in the year 1716 was allowed to join a detachment sent with supplies to the column conducted by Buchholz, which was encamped on Yamyshef Lake. The detachment under Buchholz was attacked by the Kalmuks on the Irtysh near Kariakofzar and was put to rout, when Renat was a second time a prisoner, and was taken to Djungaria. In that region he appears to have acquired a very great influence, aiding the Kalmuks in their struggle with China. It was at that time that he probably drew up the map in question from the information he obtained during his sojourn in Djungaria. Having been seventeen years in the country, Renat returned to Siberia in 1735. On his way to Sweden through St. Petersburg he must have been an object of great interest to scientific men, and, displaying his knowledge, he must have promised to send to the Russian Academy from Sweden a copy of his map. Nothing more, however, was ever heard of him, and dying, Renat and his map must have been entirely forgotten.—After an interval of 150 years a Swede has resuscitated the name and work of his countryman, bringing them forward for the appreciation of the present generation. Mr. Stryndsberg, assistant librarian of the Royal Library at Stockholm, has succeeded at last in his diligent search, and has discovered the original map in question in the library of Linköping.—Mr. Stryndsberg has kindly forwarded a photograph of this original map to the Imperial Russian Geographical Society, and the Council of the Society having charged Messrs. Mackeyef and Sreznefski with the examination of the document, has requested the Cartographic Establishment of the État-Major to reproduce a facsimile. This work seems to have been admirably executed, and the handsome binding in quarto bears the title "Carte de la Djungarie, constructed by the Swede Renat during his captivity among the Kalmuks from 1716 to 1733. Published by the Imperial Russian Geographical Society, St. Petersburg, 1881."

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* 'Proceedings,' *ante*, p. 560.

† Vide 'Proceedings,' *ante*, p. 587.

Journey of MM. Bonvalot and Capus on the Amu-daria.*—Taking advantage of the return of the Afghan Embassy, which the Amir had sent to General Kaufmann, MM. Bonvalot and Capus started from Samarkand on March 13th for the Amu-daria. The party first proceeded to Jame, near the frontier of Russian Turkistan, and thence by the caravan route to Karshi, arriving there on March 17th. Both in the importance of its trade and the number of its population, this place is the second town in Bokhara. On March 24th the travellers arrived at Kilif, on the right bank of the Amu-daria, where the heat was very great, the thermometer standing at 103° Fahr. in the shade at 2 P.M. After passing Karshi they found the country very broken, and water was scarce and bad. The route from Kilif to Karshi is used by caravans going from Northern Afghanistan to Bokhara, which cross the Amu-daria in ferry-boats drawn by horses swimming. The river is there about 450 yards broad, and has a current of over three miles an hour. The Russian escort was left at Kilif, whence the travellers started on March 28th for Shirabad by way of Chushka. The region is cultivated by a few poverty-stricken Turkomans, but nearly all the cattle perished in the winter of 1878–9, during which the Amu-daria was frozen. The richest man in the country now-a-days is said to be worth only about twelve pounds sterling. From Shirabad the travellers made for the Sur-khan Valley, and they found the Bokharan authorities very ill-disposed to afford them any information. After the village of Ak-Kurghan the region of ruins (Gul-gula) commences, and extends as far as Termez on the Amu-daria. There were found traces of brick buildings and fortresses, from which signals were exchanged with ancient Balkh, and of which the remembrance still exists in the country. This vast ruin is called in the north Shahri-Gulgula, also Shahri-samân, and Termez on the Amu-daria. MM. Bonvalot and Capus are believed to have been the first Europeans to visit it. They found there monuments of the highest interest, and collected a number of legends, in which are mixed up the names of Baber, Iskander (Alexander the Great), Tamerlane, and Genghis Khan. According to the inhabitants, the ruins are those of Sodom and Gomorrah; and the question arises whether there may not be, as at Balkh, a Greek town under the Mussulman one. This region is well watered, and the soil well suited for cultivation; there are however, but few inhabitants, except near Surshâne and in the old bed of the Oxus.—From Termez the caravan reached Shirabad across a sandy desert, and thence went to Karshi by the steppe, returning to Samarkand on May 10th by the Kashka-daria.—MM. Bonvalot and Capus are stated to have brought back with them a number of observations, documents, and collections of the greatest interest.

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* From a communication made to the Geographical Society of Paris on October 21st.

M. Wiener's Explorations in South America.—We have been favoured by Mr. Edward Whymper with an opportunity of perusing an interesting letter addressed to him by the accomplished and enterprising traveller, Dr. Wiener, who is now engaged in exploring the tributaries of the Upper Amazons in Ecuador and North Peru. He writes from Yurimaguas, on the river Huallaga, in May last, stating that after a journey across the continent from Quito to the Atlantic, viâ the Napo and the Amazons, undertaken for the purpose of meeting an intended colleague from France, with whom a scheme of exploration was to be carried out, but who failed to make his appearance, he had again ascended the Amazons to nearly the limits of navigation, in a small steamer which the Brazilian Government had placed at his disposal. In this vessel he had ascended the main stream as far as the famous cañon, Pongo de Manseriche, and steamed up the Morona, the Pastaza, and the Tigre, tributaries of the left bank; the last-mentioned, which had never before been explored, he ascended for a distance of 515 miles. His chief attention, however, appears to have been devoted to the Upper Marañon, beyond the mouth of the Huallaga, which is one of the least known tracts of the South American interior. He here discovered a new tributary, called the Samiriá. This river he ascended for 250 miles to a lake whence it takes its source, and found it, as well as numerous tributaries, perfectly navigable; the forests of its banks abounded with indiarubber trees and salsaparilla. Other streams of less importance were also for the first time explored, and M. Wiener adds that he has mapped the region examined on the scale of 1:10,000, and taken 400 astronomical observations to fix positions.

The Rio Purûs.—In a letter which he addressed to the South American Missionary Society from São Pedro de Caxoeira on July 27th, Lieutenant R. Jones, R.N., furnishes some information regarding the Rio Purûs and a scheme for connecting it with the Madeira at the junction of the Rio Beni and the Rio Mamoré, for which he is indebted to a gentleman who has founded and successfully carried on a settlement some 600 miles up this great tributary of the Amazons. The river was known to the Incas as the mysterious Serpent River, and later on by the natives of the region as the Wainy; eventually being called the Purûs, an abbreviation of *Purú-purú*, which, with the word *Myra* prefixed, signifies "painted people." The river, as is well known, was first explored by our Associate and Gold Medallist, Mr. Wm. Chandless, in 1864–5. On no other affluent of the Amazons is navigation now carried on for such a great distance as on the Rio Purûs. There are other affluents of greater volume, such as the Rio Negro and the Rio Madeira, but, owing to rapids, these are only navigable for about 500 and 400 miles respectively, while the Purûs is in the rainy season navigable for nearly its entire length. Since 1865 there has been a continuous stream of emigration to the river and its affluents, chiefly in connection with the indiarubber trade, and the population is now probably about 30,000. During every month in the rainy season at least two steamers ascend the river to a distance of nearly 1600 miles, and in the dry season they go about 1000 miles up it, or six miles above the mission station at São Pedro.—The trade on the river is at present almost entirely confined to indiarubber, but before long will also include rice, coffee, sugar, and cattle. The rich soil of the Purûs region is said to be especially suited for rice cultivation, and in a somewhat less degree to the production of sugar and coffee. The people at present on the river are emigrants from the province of Ceara, who are of little use from an industrial point of view; but, in order to promote the development of this region, the Brazilian Government are said to be making arrangements for a large immigration of Chinese. The gentleman to whom Lieutenant Jones refers has already commenced the construction of a road which is to connect his settlement on the Purûs with the savannahs, a distance of 37 miles, and his object is that it should be continued across the savannahs to the point where the Beni and Mamoré unite to form the Madeira. He is endeavouring to interest the Bolivian Government in the project, which, if carried out, will have the effect of drawing a large cattle-trade to the Purûs.

New Geographical Society.—A new Geographical Society has lately been formed at San Francisco, under the title of the Geographical Society of the Pacific. Professor George Davidson, of the United States Coast and Geodetic Survey, is the President; and our associates, Mr. Wm. Lane Booker, Her Majesty's Consul for the States of California and Oregon, and Mr. C. Mitchell Grant are respectively Vice-President and Secretary. The objects of the Society are "to encourage geographical exploration and discovery; to investigate and disseminate information by discussion, lectures, and publications; and particularly to establish in San Francisco, for the benefit of commerce, navigation, and the general interests of the Pacific Slope, a place where the means will be afforded of obtaining accurate information respecting the countries bordering on the Pacific Ocean, as well as all other parts of the world." The Society will be in a favourable position for obtaining early intelligence regarding the opening up of the Territory of Alaska, and the northern region generally.

CORRESPONDENCE.

The Recent Advance of the Polar Ice in the Greenland and Spitzbergen Sea.

Map, p. 768.

PETERHEAD, 10*th October*, 1881.

DEAR SIR,—I have sent you by mail to-day a Greenland chart, showing the margin of the ice between Iceland and Spitzbergen during the past two years.

The increase of the ice, I think, is due to the severe winter we have had lately, and to the absence of the usual drift of the ice, which was very marked in 1880 and 1881.

We have often great difficulty in keeping up our northing, being constantly driven south by the rapid drift of the ice. The past two years have been quite different, the ice has been almost stationary notwithstanding that the winds were strong from the north, up to the end of June in both years.

The absence of southerly drift can only be accounted for by the lanes of water making amongst the floes, being immediately frozen up again with the severe frosts, keeping the ice fixed together, and preventing any large waters being made to force the ice south.

The ice has not diminished during the last two summers so fast as usual, owing to the frosts covering the lanes and pools of water with bay ice, preventing the wash of the water from cutting into it and washing it away. Close ice melts very slowly, open ice soon disappears.

This winter the ice may spread still further, unless the winds prevail from the south to raise the temperature, drive the ice north and eat into it along its southern edge. If the winter winds are northerly, we may expect to meet with the ice in the spring, approaching the Faroe Islands on the west, and find it down on the coast of Norway on the east.

It appears to me that the advance of the ice south has already affected our climate. The cold bleak winds, with the dull, shapeless, leaden coloured sky, and want of sunshine, which we have had here all summer, are very characteristic of Arctic weather. We had frost here early in August, and ice was seen on the pools. I am afraid we may expect an early and severe winter.

When the *Eira* returns, Mr. Leigh Smith may add his observations, and complete the lay of the ice to Gillis Land. DAVID GRAY.

Askja, the Largest Volcano of Iceland.

16, KINGSTON TERRACE, CHARLTON, *3rd November*, 1881.

I find upon making a more extended examination this summer of the lava-flood erupted in the Mývatns Öræfi in 1875, that its description in my paper, published in the August number of the 'Proceedings,' is in some particulars incorrect.

The lava covers a larger area than is there stated, viz. "twelve miles in length from S.S.W. to N.N.E., by from half a mile to three miles in breadth," while the extent of the subsidence is not so great.

Both in 1878 and 1880 I approached the site of the eruption by crossing the deserts from the north-west, and when at a distance of three or four miles from the northern end of the lava-bed I came upon deep parallel rifts running therefrom in that direction, between which an extensive subsidence had recently taken place, its depth increasing as the lava was neared. I followed up the westernmost of the rifts until it was concealed by a sheet of lava which had spread out beyond it from the main bed; the northern end of which lies for over a mile in the trough-like hollow formed by the subsidence. Having no tent with me, and the nearest farm, Reykjahlíð, being distant 18 miles, I upon neither occasion examined the bed farther southward than the point where the westernmost rift was hidden by the flow of lava westward, or terminated; ascending to the summit of a crater-cone, about a mile and a half from the northern end of the bed, to get an idea of its extent, it stretching farther southward than the eye can follow when one is standing on the level ground. Deceived by the wonderful clearness of the atmosphere (frequently in Iceland it is possible to see from the summit of one mountain others 70 miles off), I judged the extent of the lava-bed to be as stated, whereas its length is at least 18 miles, and its greatest breadth six or seven. The people of Reykjahlíð, who scour the Öræfi every autumn in search of strayed sheep, say it is over four Danish (=22 English) miles in length. This year I stayed some time at Reykjahlíð, and, believing the bed to be but 12 miles in length, I made an early start one morning in August to ride round it, my guide and myself each having a spare pony. After riding up the western side of the bed for about eight miles, I found that I had been deceived as to its extent, and that it stretched away southward for another 10 miles at the least, while a vast sheet lay spread out westward in a depression in the Óræfi for three miles or more. At this point I had to turn my ponies' heads again in the direction of Reykjahlíđ, it being evident the poor jaded brutes could not hold out to accomplish a journey of 76 miles. A night out in the open air would have been no great hardship, for the weather was beautifully fine, and at this time of the year there would have been but a few hours' darkness; the ponies, however, had been hard ridden for over a month, consequently an addition of over 20 miles to what at the outset had been a sufficiently long journey of over 50 miles, was not to be thought of: as it was, we had to walk the greater part of the way back to Reykjahlíđ, leading our fagged-out steeds Moreover, to have found water for our ponies it would have been necessary to have either retraced our steps and gone round the northern end of the lava, or ridden on and doubled its southern extremity, and then struck eastward to the Jökulsá, a river five miles distant; adding at least another 10 miles to our journey.

Between the sheet of lava spreading westward about a mile from the northern end of the main bed, and the far larger sheet spreading out in a similar manner about midway, no subsidence had taken place during the 1875 eruption. An older lava-flow here underlies the newer for some considerable distance, and this, when I examined the bed from the crater, I mistook for new lava lying in a trough-like hollow like the one to the northward, and concluded that a subsidence had taken place the whole length of the bed. I was told by a man at Reykjahlíđ, who had been to the southern end of the lava, that deep rifts were to be seen there, and that a subsidence had taken place between them, but he could not say how far to the northward it extended.

Wm. Geo. Lock.

REPORT OF THE EVENING MEETINGS, SESSION 1881–82.

First Meeting, 14th November, 1881.—The Right Hon. Lord Aberdare, President, in the Chair.

Presentations.—*Major C. R. Macgregor* (Bengal Staff Corps); *Rev. E. A. Davies.*

Elections.—*John W. Anderson, Esq.*; *Lieut. W. H. Coombes*, R.N.; *Charles Theodor Knaus, Esq.*; *Kenneth M'Lea, Esq.*; *Maurice Portman, Esq.*; *Henri Rüffer, Esq.*; *William Balin Smith, Esq.*; *Frederick West, Esq.*

The President opened the New Session with the following address:—

Ladies and Gentlemen,—The practice which prevailed during the long presidency of Sir Roderick Murchison of making on the opening of every new session an elaborate address almost of the same importance as that delivered at the Anniversary Meeting, has not been followed by my immediate predecessors; and in my opinion it would be well that their example should be adhered to until another Sir Roderick arises. I shall therefore adopt the recent practice and simply bring before you the principal events connected with geography since we parted in June last.

It was about the end of July that I received a letter from Prince Teano, the President of the Italian Geographical Society, informing me of the expected arrival of Dr. Matteucci and Lieutenant Massari from a very long and arduous expedition across the broadest part of Africa. I immediately communicated with the officers of the Geographical Society, but no news reached us of the expected travellers until I had left town, when I heard of their arrival, and at the same time of the death of Dr. Matteucci in London. He landed with Lieutenant Massari in Liverpool on the 5th August, but died almost immediately after his arrival in London on the 8th. The Italian Ambassador and Lieutenant Massari called upon me at my residence in town, but unfortunately at that time I had left London. The remarkable journey accomplished by these travellers commenced in March 1880, when, accompanied by Prince Giovanni Borghese, who paid the cost of the expedition, they started from the port of Suakin, on the Red Sea. They proceeded thence to Khartum; they traversed Kordofan and Darfur, staying at the principal towns of each country, Prince Giovanni Borghese returning to the Mediterranean by the caravan route from the capital of Darfur. Having spent some time among the wild tribes of Wadai, they proceeded to Kuka, on Lake Chad, and remained a considerable time in the town of Kano, which is described by Lieutenant Massari as containing some 50,000 inhabitants. From there, taking a south-westerly course, they reached Egga, on the Niger; there they were met by Mr. Macintosh, the agent of the West African Trading Company, who generously conveyed them to the mouth of the Niger on one of the steamers of the company, an act of kindness for which Lieutenant Massari expressed his gratitude in his address to the International Congress at Venice; and they returned home after a journey across Africa occupying some sixteen months.

In one respect this expedition is perfectly new, that is to say, the two Italian travellers are the first who have travelled the whole breadth of the Soudan from sea to sea; but there are very few portions of the route which have not separately been visited by preceding travellers. Kordofan and Darfur have been not only visited by various travellers, but of late years they have been surveyed by American engineers in the Egyptian service, and by English engineers under the orders of our distinguished countryman, Mr. Fowler. Of Wadai much less was known, owing to the fanatical jealousy of its people towards strangers. It was in this country that Dr. Vogel was barbarously murdered; but more recently, in 1873, it was traversed from west to east by Dr. Nachtigal. Then as regards Kuka, on Lake Chad, and Kano, these towns have been visited, during the last fifty years, by various English and German travellers, and of course the part of the Niger seen by them has been familiar to travellers for a very considerable period. There is, therefore, but little absolute novelty in the countries they have described. What they have been able to do is to fix with accuracy the latitude and longitude of a considerable number of towns, and so far they have rendered service to geography; and there is no denying that they showed very great courage and extraordinary perseverance in executing a journey full of apprehended and real danger—a danger so great that Dr. Nachtigal informed the Venice Congress, after Lieutenant Massari's address, that he had done his best to advise them not to undertake so perilous a journey. One can understand that they should have neglected this warning, because nothing could be more remarkable in the recent resurrection of Italy than its desire to vindicate its old reputation in every walk of civilisation, and especially in the path of geographical discovery. We know what we owe to the Italians, and we know that for their own profit and for their own honour they were the great travellers by land in the middle ages, from Marco Polo downwards; and we know that although, owing to the then condition of Italy, broken up as it was into separate States, they sent out no great naval expeditions of discovery on their own account, yet they furnished the maritime skill and the extended knowledge of geography in the persons of Columbus, Sebastian Cabot, the Zeni, and others, which gave them the command of expeditions from Spain, from Portugal, from France, and from England, which accomplished the great things with which we are all familiar. The Italians are weary of this *sic vos non vobis* policy; they are anxious to do something for themselves, and I feel convinced that the time is not far distant when we shall see Italian ships vieing with the boldest Arctic and Antarctic navigators. At this moment the Italians are looking forward with great interest to the proceedings of Lieutenant Bove of the Italian Navy in an Antarctic expedition which he is about to undertake, not on behalf of Italy itself, but on behalf of the Argentine Republic.

Another event, which must have been of great interest to all the members of the Society, was the meeting of the British Association at York. The Geographical Department of that Association is almost always conducted by men of great knowledge and of great reputation, and addresses worthy of this country, and of the state of geographical knowledge, are usually delivered; but I will undertake to say that on no previous occasions were the addresses of greater interest and more worthy of careful study than those delivered at the meeting of the British Association at York, in the beginning of September last. The address of Sir Joseph Hooker, the President of that department, is a masterpiece of its kind; his rapid condensed review of the progress of geography within the last fifty years, due to the fact that the British Association was celebrating its fiftieth anniversary, was itself an admirable performance; but of far greater interest and importance was that part—the larger part—of the address which dealt with the increased knowledge of the distribution of plants, and which threw a new and vivid interest especially upon the Arctic regions and upon the large, and to most persons unexpected, part which they have played in the distribution of flora over the world. The Romans, during the fall of the Empire, vexed and troubled and harassed by the continual incursions of tribes in the North, used to call the North the *officina gentium*, "the factory of nations," and it would appear from recent discovery and investigation, as set forth by Sir Joseph Hooker, that we may look upon the "frozen North" as the great nursery of the existing flora of the world, a discovery, as I said before, as interesting as it is unexpected. But Sir Joseph Hooker's address was not the only address of interest delivered upon that occasion. He was followed by Sir Frederick Evans, the Hydrographer of the Navy, who gave an account of what had been accomplished everywhere, but especially by this country, in the careful examination of the shores of continents and islands and of seas. No doubt, as we all know from statistics, of which we have heard a great deal during the last few months, England has a navy nearly equal to half of that of the civilised world and, therefore, it might be expected that the part that England should take in the survey of the ocean and its shores would be a considerable one. My belief is that the part taken by England is even more than commensurate to the proportion of its navy to the navies of the world, and that active as many countries are in this useful and necessary work, no country has played so large a part and is now so actively engaged in this work, as the British nation. Then, again, interesting and admirable addresses were delivered by Sir Richard Temple on the discoveries made in Asia during the last fifty years; by Mr. Clements Markham on the advance of knowledge in the Arctic regions during the same period; and by Colonel Grant on the progress of discovery in Africa, a country which we may say has been, in part, almost "invented," to use the Latin term, during that period. Not of less interest, perhaps, was the stirring address given on that occasion by the Rev. Horace Waller, whose speech reflected the enthusiasm which has carried so many men, like Livingstone and his followers, into discoveries as much for the benefit of science as for the advantage of the human race.

I think we ought not to pass over, as being of the greatest possible interest, the address given by that great benefactor of travellers, Mr. Francis Galton, upon the improvements made in the means of travelling, so as to enable the traveller to execute his work with the utmost possible safety. All these things show, I think, a great deal of healthy life, whether they record the progress of scientific knowledge or of daring in enterprise during the last fifty years; and I must say it seems to me to give an answer to those sickly moralists who are continually declaiming upon the decadence and deterioration of the human race, physically and morally. I, on the other hand, would venture to say that, judging from the ardent love of science, judging from the daring, the spirit of adventure, the perseverance, the fortitude displayed during those times, instead of talking of deterioration and decadence, we may point to the last fifty years as proving satisfactorily and conclusively that the human race is rather improving than falling off. And if that is true of the human race generally, considering how large a part in these discoveries has been taken by the British race, I think we may fairly arrogate no small part of the merit to our own countrymen.

Another meeting, very different in character and yet of great interest, which took place during this autumn with reference to the question of geography, was the International Congress of Venice. You are aware that the first idea of an International Congress occurred to the Belgians when what was intended as the erection of memorials to some eminent Belgian geographers was turned into an occasion for bringing together the geographers of the world. The first Congress took place about ten years ago at Antwerp, and it was followed at an interval of five years by another at Paris; and a third has now been held in the ancient historical city of Venice. It is hardly now the occasion to discuss the advantages of these Congresses. If you look to any great advancement of knowledge made upon those occasions, of course these meetings might be proved to be barren enough. On the other hand, I think it is hardly possible to bring together men of science and travellers from all parts of the world to discuss the questions still unsettled, and those which may be called the questions of the future, without some advantage arising from their meeting. And certainly there was assembled at Venice a great number of the most distinguished men in every branch of geographical knowledge, both theoretical and practical. To one accustomed to Congresses in England, the arrangements, certainly, in many respects seemed imperfect. We are accustomed here to see, not only the addresses of the President, but the discussions from day to day, in proportion to their importance, regularly reported in the newspapers so as to enable those who follow them with interest but who are unable to attend the sections, at any rate to know what is going on. The condition of the Italian press made such a state of things impossible in Venice. The only speeches that were reported were the opening addresses delivered by the President of the present and the President of the last Congress; and after that there was the very barest skeleton account given of the proceedings of the various sections from day to day. Contemporaneously with the Congress was held an Exhibition of the greatest interest, upon which I shall have a word or two to say; but here again, the very fact that the Exhibition was held at the same time as the Congress, was injurious to the Congress itself as a deliberative body. The Exhibition contained objects sent by all the principal States of Europe. They looked, not without jealousy, at each other, to see that their respective merits were duly acknowledged. In order that they should obtain that result, it was necessary to appoint men of the greatest eminence to serve on the jury, and the consequence was that the deliberations of the various sections were very much weakened by the abstraction of so many eminent men serving upon the juries.

Then as to the Exhibition itself. I am sorry to say that the part played by this country was not what we should desire it to have been; but I am also bound to add that in my opinion that was not the fault of the Geographical Society, nor do I wish especially to cast the fault anywhere; but I will just mention that, as a matter of fact, the Geographical Society was applied to by Her Majesty's Government, through the President of the Privy Council, as to what they advised the Government to do with respect to the International Congress. The Government had been invited by General Menabrea, the Minister representing Italy, to take part in it, to appoint Commissioners, and to contribute their utmost to the success of the Congress, to which Italy looked forward with great interest. Our answer was sent without delay upon the 31st of January; but although no pains were spared to obtain a definite statement as to what part the Government would take, we were unable to get a final answer until late in the month of June, when it was too late to communicate with the great map-publishers or to take measures to enable us, as the State itself declined to take any leading part in this Exhibition, to supply the want of Governmental interference. Certain Departments of the Government, indeed, gave important assistance. India sent a really magnificent contribution. The Admiralty sent a large number of charts of very considerable interest; but inasmuch as the Government would not undertake to pay the expenses of any trusted officer of the Admiralty to Venice and back, the Admiralty very wisely declined to send selections from that vast mass of original documents, which would have been looked at with the greatest interest at the Congress, and some of which were sent to South Kensington on the occasion of the Exhibition of Scientific Instruments, and were among the most interesting objects there exhibited. These two departments, India and the Admiralty, certainly did credit to the country. The Ordnance Survey also supplied a few specimens of very admirable workmanship; but the fact was that the contributions of England were contained in one not very large room; whereas those of the leading countries of Europe, of France, of Russia, of Austria, and Italy, severally filled several rooms, and were rich in almost every department of knowledge and of interest bearing upon geographical study. The fact was, that at that very moment, no less than three public International Exhibitions in different parts of Europe were going on; and the Treasury declined to furnish the necessary means for sending from this country articles of interest, and securing their safety when sent. 100*l.* indeed was sent to the British Vice-Consul at Venice, which was very properly spent in covering the walls with the maps which had been sent out; but I need not say that 100*l.* went a very little way towards providing for the adequate exhibition of such objects as England might have sent. The most interesting Exhibition, historically, undoubtedly was the Italian. They were the first map-makers of the world; they, with the Portuguese, were the earliest travellers, and they had a magnificent collection of interesting articles, showing the earlier progress of geography, and admirably exhibited. Probably, from the time that the Italians ceased to distinguish themselves as geographers, the country that has taken the most prominent lead has been Great Britain; and there is no doubt that, had we exerted ourselves, we could have made an Exhibition superior to that which any country of Europe could have offered. The result was that when the various prizes were distributed which were taken as tests of merit, England, instead of being at the head, stood sixth or seventh on the list, many a small country preceding us. A distinguished foreigner, whose name is well known, came to me and said, pointing to the whole of the English collection, contained in one room, "All this is very well so far as it goes; but this relative poverty comes of your thorough English pride. You know very well that you are very rich in discoverers; you know very well that you could have covered many of these rooms with articles of the greatest interest; that your collections are almost unrivalled; but you are too proud to take pains to contend with other countries; you are content with your good opinion of yourselves, and the consequence is that your prestige suffers much in the opinion of those who are not thoroughly well acquainted with the facts." And a clever Italian writer, whose critique upon the Exhibition I have seen, and whose spirit towards England is thoroughly sympathetic and friendly, says that England is a country apart from the rest of the world—we are, in fact, what Virgil calls us, "Penitus toto divisos orbe Britannos," and that if the people of Europe wish to see what treasures are contained in England, they must get up an Exhibition in London itself, where, from her natural hospitality, and her pride of pre-eminence, England will take care that her collections shall appear in all their completeness, their originality, and their power. I confess I hope that time may come. Discussions were already going on as to where the next Congress shall be held; but, of course, I was very careful not to commit this country to what is to happen some five years hence. I may say that the English unpaid Commissioners, Sir Henry Layard, Mr. John Ball, and myself, as well as those who represented the India Department, Sir Henry Thuillier, Colonel Haig, and Captain Baird, were received with the greatest kindness and hospitality, and that they will carry away none but the most pleasant memories of their reception during the time they were in Venice. I hope it will be found possible to print the Report prepared by a most competent person, Captain Baird, who not only took care to make the best of the Indian Exhibition, but to acquaint himself with what other countries were doing, in order that you may see in detail what really was accomplished at the famous Congress of Venice.

I pass now to the last subjects which I think it necessary to touch upon, and those are subjects connected with Arctic exploration. Some of you, I dare say, will remember that in the anniversary address which I delivered in May last, I referred to the expedition sent by the Americans in the *Jeannette* in the prosecution of discovery in the North Polar Seas. The *Jeannette* is better known to us by the familiar name of the *Pandora*, under which it was commanded by Sir Allen Young. She was bought, fitted out, and provisioned by Mr. Gordon Bennett; but he having contributed so much to the expedition, the American Government provided officers and men, and the crew are under the discipline of the American Navy. They passed up by Behring's Straits in the autumn of 1879, and were last seen steaming towards Wrangell Land on the 3rd of September of that year. From that time to the present nothing has been heard of them. There have been, from time to time, rumours of white men seen by natives, some on the coast of Siberia, and some on the coasts of North America; but as yet no trustworthy trace has been found of the *Jeannette* or her crew. In 1880, an American cutter, the *Thomas Corwin*, was sent out to look for her. She got as far as Wrangell Land, which she could only approach within 25 miles, the intervening space being filled with impenetrable ice, and then was obliged to return, having done nothing. She was despatched again this year, but has returned without tidings of the missing expedition; and another vessel, also sent out this summer, the *Rodgers*, commanded by Lieutenant Berry, has been equally unsuccessful in its principal object, although it has achieved a feat of considerable importance, namely the discovery of the limits of Wrangell Land, which was supposed to extend very far north, but which in fact was circumnavigated by boats belonging to the *Rodgers;* but no trace whatever was found of the *Jeannette*, and the *Rodgers* has gone into winter quarters on the Asiatic side of the Straits of Behring. The whole of the civilised world is looking with the deepest interest as to what can possibly be done to relieve the crew of this ship, if they are still alive.

I think it would be our feeling that, both for the general cause of humanity, and on account of the great and prominent interest which the United States and her citizens have taken in everything that affects English adventure, whether it were the search for Franklin and his crew, or afterwards the discovery of remains of his expedition; whether it were the restoration of the *Resolute* to us, or in fact whenever any occasion of sympathy has arisen, that something of active sympathy should be shown towards the Americans under these circumstances. It has been suggested that the most practical means of doing so would be to send an expedition, not by sea, which would have to go round by Behring's Straits, and which therefore would be much more accessible to the Americans than to us, but by land, and that the Hudson Bay Company, occupying as they do so large a portion of Northern America, might be at any rate the agents for fitting out an expedition for us to see whether the coast on either side of the Great Mackenzie river still contains any remains of the expedition. I have fervent hopes that this will be done; at any rate I may announce that the Council of the Geographical Society authorised me to-day to communicate at once with Her Majesty's Secretary of State for the Colonies on this subject.

There is another adventurer of British blood whose proceedings we may look upon, I think, with less anxiety, although with not less interest—I mean Mr. Leigh Smith, to whom we presented our gold medal for his remarkable voyage to Franz-Josef Land last year. Mr. Leigh Smith started from Peterhead early in the summer of this year, was seen off the coast of Novaya Zemlya on the 7th July, steaming northwards, but has not been seen since. The Dutch expedition sent out in the *Willem Barents* this year into a portion of the same seas, must undoubtedly have sailed across some portion of the track pursued by Mr. Leigh Smith in the *Eira;* but they were driven about so far to the east and west of the course he would have pursued at different times that it was hardly probable that they would have met. Mr. Leigh Smith took out provisions which were amply sufficient for eighteen months, and which might be made to suffice for two years, and it is probable that he contemplated staying over the winter in case he saw an opportunity of successfully prosecuting his voyage in the next year. He with, I believe, characteristic reserve, declined to express any decision as to what his course would be on this subject, but those who know his ardour as a discoverer, and how much he enjoyed his signal success in the expedition of last year, would rather expect that if successful in reaching Eira Harbour, the highest point he reached last year, he would not improbably make arrangements for wintering there, and for endeavouring to prosecute his journey in the next year. I think, therefore, we may fairly dismiss all extreme anxiety about Mr. Leigh Smith, in the hope that if something is not heard of him next year no time will be lost in going to his relief.

I have gone through the principal incidents with which it is necessary to trouble you, and it is now my pleasing duty to introduce to you the gentleman who will read a paper this evening, Mr. Simons. There are some things men cannot themselves tell which it is convenient should be told by the President of the day. I have therefore very great pleasure in saying of Mr. Simons that he is a distinguished ornithologist, that as such he has been prosecuting his researches along the sides of the Sierra Nevada, the remarkable group of mountains in the very north-west corner of South America; that he is not only an ornithologist, but is also master of many branches of knowledge which qualify him to be an admirable geographical observer. The country which he is about to report to us is one as to which we have very little knowledge; it is a country of great interest, a lofty chain of mountains seen from the sea by those who sail to the Isthmus of Panama, which have so often been confounded with the Andes, but are entirely separate from them. That is the subject of the paper which we shall hear this evening, and I invite you to give to Mr. Simons, as I am sure you will, an attentive and favourable hearing.

Mr. F. A. A. Simons then read his paper on the Sierra Nevada of Santa Marta (*ante*, p. 705).

REPORT OF THE THIRD INTERNATIONAL GEOGRAPHICAL CONGRESS.

VENICE, SEPTEMBER 1881.

By Captain A. W. BAIRD, R.E., Commissioner for India to the Congress.

IT will be remembered that the first International Geographical Congress was held at Antwerp in 1871, and the second at Paris in 1875. On the invitation of the Geographical Society of Paris, the Italian Geographical Society undertook the necessary arrangements for the third Congress. The Italian Government and the City of Venice having given their co-operation, it was determined to hold this Congress at Venice in September 1881. It was also decided that an exhibition of objects connected with the subject of geography should be held, and invitations were widely distributed to the various Governments, most of whom liberally responded.

His Majesty the King of Italy not only honoured the Congress with his patronage, but favoured it with considerable support: moreover, he granted the use of the Royal Palace at Venice for the Exhibition: but the number of nations represented and the amount of exhibits sent to Venice were so great, that it was found the Royal Palace would not afford sufficient accommodation; accordingly a large wooden building, or annexe, was constructed in the Gardens of the Royal Palace.

The arrangements decided on for the Congress and Exhibition were, that the latter should be opened on the 1st and closed on the 30th September, while the Congress should be held from the 15th to the 22nd of the same month.

The Exhibition—which of course consisted chiefly of maps, charts, surveying instruments (ancient and modern), ethnographical collections, &c.—was opened by Prince Teano, President of the Italian Geographical Society, on the 1st September, in the principal room of the Royal Palace. This room formed part of the space allotted to the Italian section of the Exhibition. The proceedings were of a purely formal character. The contributions from Italy, France, Chili, the Military Department of Austro-Hungary, Austria, Canada, Greece, Egypt, Japan, and Belgium were exhibited in the rooms of the first floor of the Royal Palace; while the second floor was occupied by Hungary, Spain, Germany, the United States, Switzerland, the Netherlands, and Victoria (Australia). The separate building or annexe was filled with the objects sent by England and India, Russia, and Sweden.

Canada, Australia, and the other colonies were not grouped with England and India in the same building, and it appeared to me the arrangements, as far as England was concerned, had not been properly considered previous to the opening of the Exhibition. Fortunately Colonel Haig, R.E. (who had been appointed by the Indian Government as one of their commissioners at the Congress) arrived in Venice early in July; he took in hand the English exhibits as well as those of the Indian Survey Department.

The Congress was divided into eight groups, corresponding to the eight classes into which the Exhibition was divided; these were:—

I. Geography—Mathematical, Geodetical, and Topographical.
II. Hydrography and Marine Geography.
III. Geography—Physical, Meteorological, Geological, Botanical, and Zoological.
IV. Anthropological, Ethnographical, and Philological Geography.
V. Historical Geography.
VI. Economical, Statistical, and Commercial Geography.
VII. Methodology, or the teaching of Geography.
VIII. Explorations.

I shall now briefly describe the Exhibition, and the Italian section being the first we came to on entering the Royal Palace, I shall commence with it. In the first room was to be seen a table covered with various scientific instruments, such as thermometers, barometers, vaporimeters, &c., and along with these a huge self-registering anemometer and pluviometer. Marine charts were hung on one wall, while on another was arranged a very interesting collection of arms, utensils, clothes, musical instruments, &c., which had been obtained during L. M. D'Albertis' expedition to New Guinea in 1872–75. Near these were two good maps or plans illustrating the draining of Lake Fucino, or Celano. In the Great Hall beyond this room we observed first the huge model of a Venetian trireme, with rows of seats each occupied by two or three men, and each man with an oar, thus aggregating some 200 rowers. In front of this was a table with ancient astrolabes and surveying instruments; and still further on were tables covered with relief maps of Candia, and the cities of Zara and Suda in 1612, also of Vesuvius, Etna, and their surrounding countries—these latter were in bronze, and had been modelled in the Italian Military School, and certainly were most creditable performances. The most interesting object in this room, however, appeared to be Fra Mauro's map of the world in its very large frame. One wall of this saloon was occupied by specimens of Italian maps as produced in the fourteenth, fifteenth, sixteenth, seventeenth, and eighteenth centuries, ending off with some elaborate maps recently published. There was exposed on one side of the room a large photograph of Matteucci, the distinguished Italian traveller who lately died in London, and opposite to this was placed a curious gilt statue of Marco Polo "said to be a copy of the idol worshipped in the temple of the 500 genii at Canton, and believed to be an effigy of Marco Polo." The remaining small room and passages occupied by the Italian exhibition were filled with books and maps for instruction from the Institute of Technical Schools, a case of relief maps from the Department of Public Instruction, school maps and globes, photographs of Alpine scenery, a case of objects from the Alpine Club of Rome, specimens of minerals, and a few geological maps.

The French section came next. On entering it we first noticed a very large glass case, inside of which were exposed some beautifully finished instruments, such as an azimuth circle, a large meridian circle, a "Planchette Chronographique" for time signals, a theodolite, and various other surveying instruments; they were all new and unused; they appeared of peculiar and inferior design to one accustomed to those of Troughton and Simms, or Cooke and Sons. Hung on the walls of this room were triangulations, one of which showed the extension of the triangulation to and connection with Algeria, by means of a quadrilateral figure. Topographical maps hung on screens, and shelves filled with charts and publications of the French Admiralty were also here exhibited. In the next room was a splendid contribution from the Ethnographical Museum of Paris, viz. the representation of the interior of a Breton house in the environs of Quimper in 1840, called "Preparations for a Wedding"; the figures were life size, dressed in the quaint costumes adopted in that country half a century ago: there were two other specimens of this kind, one representing a Montagnard Basque, and the other a peasant of Dieppe. Some interesting ethnographic pictures by M. Regamy for the Museum of Guimet at Lyons, also maps and publications regarding the mission of Alfred Grandidier were shown in this room. In a small room beyond, we found sketches and photographs illustrating various scientific expeditions which had been encouraged by the French Government. Then we came to a room containing a huge geological map of the north of France, and several other geological charts, as well as maps of the ports of France and statistical maps, also specimens of photographic reproductions on zinc and on paper. Here were also exposed maps from the School of Mines, and from the

Director of Railways. The last room of the French section was filled with a contribution from the great publishing firm of Hachette, in Paris, such as 'L'Inde des Rajahs,' Rome, the Adriatic, &c., &c.; also we noticed a beautiful copy of 'Geography' by Elisée Reclus, 'Le Tour du Monde,' as well as numerous maps by Vivien de St. Martin.

Chili had a small room filled with a few maps and specimens of minerals, also a collection of rock specimens from the desert of Atacama.

Beyond the room set apart for Chili, we found the collection sent by the Military Department of Austro-Hungary, the Director of which is Captain Von Kalmar, of the Austrian Navy. The most important object in this exhibition was the special map of Austria-Hungary reproduced by heliography. Of this great map 390 sheets are already published, and when complete it will consist of 710 sheets, which it is expected will be ready for issue in 1885. Great strides have been made in the art of heliography by the Military Institute at Vienna, and certainly the sheets of this map which were exhibited were beautifully executed. A liquid compass by Garcio, a compass with universal corrector and a controlling compass, both by J. Peichl, were also seen in this room; but one of the most important objects in this section of the Exhibition was the excellent work called 'Technik der Reproduction,' by Major Volkmer, giving details of lithography, photo-zincography, heliography, &c., as used in the various stages of map-making; this splendid work was accompanied by an atlas illustrating the various processes.

Next to this we found the Austrian exhibition; here were observed maps and publications of various kinds, showing the results obtained by Austrian travellers, the principal of which were the grand collection of Dr. Holub, and those of Count Széchényi by Lieutenant Kreitner. Here were also exhibited relief maps, water-colour sketches, and photographs of Alpine scenery, as well as models of Alpine houses, &c., sent by the Austrian Alpine Club. In another room beyond were exposed geological maps of Austria, Greece, and Turkey, a great collection of school maps, globes, instruments, and drawings, such as are used in the Austrian schools for teaching geography: we also noticed a capital detailed map or diagram showing the values of the level of the Danube for each day during the last six years.

Canada comes next; and the most important objects in this exhibition were some geological maps, a splendid collection of specimens of the various woods found in Canada, with a tabular statement explanatory of their localities, prices, &c., also some large and beautiful photographs of the Falls of Niagara.

The Argentine Republic occupied the next room, the best contribution from this State being a series of star maps published in 1877: beside these were a few maps, views, and photographs of different places in the Argentine Republic.

Greece was next represented. The most important object in this part of the Exhibition appeared to be the plans and detailed drawings of General Türr's project for the canal through the Isthmus of Corinth, which will shorten the distance from the Italian and westerly Mediterranean ports to the Piræus and Constantinople.

Egypt exhibited a room full of armour and implements from the Niam-Niam country and Latuka, horns, hides, war drums, saddles, cooking utensils, &c., from Bari; and crocodile skins, bead necklaces, and garments worn by chiefs, spears, bows and arrows, &c., brought back by various expeditions in the African interior.

Japan sent a case of minerals, some stuffed birds, and a herbarium, also an excellent collection of the woods found in that country. There were exhibited in this room some curious old illustrated books, and a case of butterflies, as well as one of beetles.

Belgium occupied two rooms; in the first were exposed two large and well-executed geological maps, and a very fine hypsometric map; hung on the walls were some very good topographical maps of Belgium; these, with a collection of globes and school maps, and a table covered with the publications of the Belgian Geographical Society, completed the objects in this room. In the second room we noticed some capital maps, such as "The Province of Liège," "Partie Occidentale de la Belgique," &c.; also some excellent topographical sheets, and a splendid atlas of Belgian maps.

On going up to the second floor of the Exhibition we passed through some corridors filled with objects from the Netherlands collection, and entered the Spanish section. Here was seen an excellent contribution of geodetic productions from the Spanish Institute of Geography and Statistics, such as maps, and charts of triangulation, topographical sheets, &c., of the Peninsula; also a set of three volumes of the 'Memoirs of the Institute of Geography and Statistics,' and numerous books containing the observations, and computations for latitude and longitude and azimuth, of the various points shown in the triangulation charts. Among the articles in the Spanish section were charts showing the geodetic junction of Spain and Africa by means of a vast quadrilateral figure—referred to previously in remarking on the French exhibition—which was carried out by French and Spanish engineers. The sides of this great quadrilateral measure upwards of 270 kilomètres, and the luminous signals employed were electric lights. There were also exhibited a great topographical map of Spain—scale $\frac{1}{50000}$—with contour lines at every 20 mètres, and full of detail; also some maps and books showing the result of some 7000 kilomètres of what was called "compound levelling" (corresponding to our levelling in India by two independent observers working over the same pins). Some very neat field books and itineraries were shown by the "État-Major," and the War Department exhibited some interesting ancient plans.

Specimens of Coello's well-known maps were shown separately and in an atlas, but perhaps the Spanish collection was strongest in its "Historical Geography," such as a collection of precious documents from the archives of Simancas, regarding the navigation of the middle ages, copies of letters from Christopher Columbus, and charts of Buenos Ayres and Paraguay; there was also a remarkable atlas dated 1588, compiled by C. Sgrothenus, one of the geographers of Philip II. of Spain; this contained 38 maps, all drawn by the author himself.

In the Hungarian exhibition the most important objects were original maps of the Tisza and the Danube, taken for the regulation of the navigation of these rivers; also a map showing the affluents of the latter river, and what were called hydro-technical maps of the Franz canal. In this room was exposed a beautiful herbarium, containing specimens of all the woods and plants growing near the Hungarian State Railway. There were also exhibited triangulation charts of Buda-Pesth, relief maps, detailed plans with fourteen volumes of original computations for the Hungarian State Railway, a section of the artesian well at Buda-Pesth over 3000 feet deep, some beautiful drawing instruments, and a whole set of maps and plans of Szegedin before and after the inundation; some statistical maps, and municipal publications from Buda-Pesth were also shown.

In the German section one of the most conspicuous objects was a large portable diagonal transit instrument, the level of which hung from the axes instead of the usual striding level; it is used principally for prime vertical transits, and it can be very readily and quickly reversed; then there were some good maps of Bavaria by the Quartermaster-General's Department, and various geological maps.

Drawings and publications illustrating Dr. Schweinfurth's travels in North Africa were exhibited, and also some capital school maps, and an excellent collection of "Gummi Karts." In another room were seen some very good hypsometrical maps, and near them some beautiful sight-rules with clinometers, a fine universal instrument, as well as some mathematical instruments, and drawing pens of new and good design by Sprenger of Berlin; also we noticed a very fine and elaborate pantograph, a unifilar magnetometer, and a good collection of ancient geographical and astronomical instruments.

We now come to the Swiss exhibition: here were shown Dufour's grand maps, and some really beautiful relief maps of Monte Rosa and surrounding country, the Matterhorn, &c.; we also saw an immense collection of publications, &c., from the Meteorological Department; there were maps and plans of the glaciers, showing their daily and periodic changes of position; also a complete set of plans and sections from the St. Gothard railway, as well as those for the proposed Simplon railway.

The United States sent a small contribution, which consisted of maps, charts, and plans, as well as photographs of rare Western scenery. There were reports and charts of the survey of the St. Lawrence and Mississippi rivers, and of the survey west of the 100th meridian. Some fine geological maps were also exhibited: the Signal Service displayed a set of tri-daily weather maps for several months past; the Coast Survey sent a model of the Gulf of Mexico, lately perfected from results of deep-sea soundings. The Lighthouse Board sent charts of all the lights and beacons, and the Post Office and Agricultural Departments sent reports and maps.

Victoria (Australia) showed some good topographical maps, an ingenious machine called "Crellin's Traverse Tables," also some large drawings of insectivorous birds and venomous snakes, and various other interesting objects from the colony.

The Netherlands sent a large collection of maps of all kinds, the most remarkable of which were those done by the chromolithographic system of Eckstein, which were really beautifully executed; there were also some capital specimens of "Alberttypic" and photographic maps of portions of Batavia and Java.

In the annexe to the Exhibition we first entered the English-Indian section; but nine-tenths of the whole contribution came from the Survey Department of India. There was a grand show of instruments here; these were, the signal apparatus—heliotropes and argand lamp with parabolic reflectors—for day and night signals, many splendid theodolites, levels, subtense instruments, transit theodolites, &c.; in fact a representative instrument of almost every kind used formerly in the Great Trigonometrical Survey of India, or at present in use in the survey of India. Conspicuous among all there was the "Great Theodolite" constructed by Troughton and Simms under the superintendence of Colonel Everest in 1827–30; upwards of 1800 of the principal angles of the Indian triangulation have been measured by it, and it has been used at over 500 stations, some of which were more than 5000 feet above sea-level. Its total weight with appurtenances is 1050 lbs. The standard level and staves, &c., exhibited were representative of the instruments used so extensively in the survey of India, which has executed over 6500 miles of first-class double-levelling, according to the rigid method of procedure laid down by General Walker. Perhaps the most attractive instrument—at least to the general public—in this section, or indeed in the whole exhibition, was the self-registering tide gauge, which had been set up so as to register the tides in the Grand Canal. This instrument, constructed by Mr. Adie of London, has all the modifications and improvements which I devised and suggested from time to time, during my experience with these instruments in the last six years; it is typical of those in use at twenty-two tidal stations in India. A self-registering aneroid and anemometer were exhibited alongside, and these are similar to the instruments set up at the tidal observatories in India. Diagrams showing the performances of the tide gauges, working on different scales and at various places, were hung on the walls. Near these were exposed huge maps of Simla, Jutog, and also of the Island of Bombay; and not far from these was hung the largest map in the whole exhibition, entitled "Part of India" A dip circle and magnetometer, perambulator, optical square, mountain barometer, prismatic compass, &c., &c., were also sent by the Indian Survey Department, as well as explorers' instruments, the Tibetan prayer-wheel, drum, and trumpet, carried by the native explorer (Pundit Nain Singh). There were also shown, area combs, planimeters, aneroids, &c.; in fact almost every kind of instrument used in the survey. Triangulation charts, showing both principal and secondary triangulation, beautiful topographical productions, Afghanistan maps, war maps on cloth, and numerous portfolios full of cadastral, revenue, and topographical maps were here exposed, on screens, tables, and shelves. Then the publications of the Survey Department nearly filled the top of one long table, pre-eminent among them being the volumes of the Great Trigonometrical Survey by General Walker, R.E., the present Surveyor-General of India.

England itself contributed a good collection of the Ordnance Survey maps, and on the walls were hung some large maps from that Department, such as "Part of Scotland," "Part of London," &c.; there was also a fine map of Jerusalem on one of the walls. The Admiralty sent a large collection of charts in portfolios, and some charts on wooden frames; there were four cases of Admiralty publications which appeared very complete. It is a pity that the beautiful charts of the Hydrographic Department of the Admiralty were not better shown, as they were almost lost in their portfolios. The Ordnance Survey sent splendidly got up volumes of the Domesday Book, and the national manuscripts of England, Scotland, and Ireland.

The Russian section had some capital maps, itineraries, and route sketches from the État-Major of St. Petersburg; in the centre of their exhibition was exposed a very fine deviation compass constructed by Brauer, on Colong's principles from Sir William Thomson's ideas. They also showed some well-finished surveying instruments which had been used in the Balkan peninsula. Then there were hung on the walls, maps of Central Asia, including Khokhand, Turkistan, &c.; underneath, lying on tables, were charts, books, and various publications relating to Finland; but the most interesting part of the Russian exhibition was undoubtedly their "Museo Pedagogico." Here were seen, on brackets, miniature figures, typical of the people in various parts of the Russian dominions, various maps and globes for teaching children in schools, models by means of which they teach geography to the blind; we also saw specimens of the field sketching, hill shading, and map-making generally, done by pupils in the schools. There were also exposed in this room a very fine collection of maps and publications from the Statistical Department.

In the Swedish exhibition was seen a huge skeleton of the *Rhytina stelleri*, and on the walls round it were hung specimens of the marine vegetation on which this enormous animal fed. There was one room completely filled with objects brought back from the *Vega* expedition; of great interest were the drawings of the "Tchukches," as illustrating the customs of the Palæolithic man of Western Europe. In another room we found a model of the famous Viking vessel discovered two years ago in Norway, and here were also shown geological, statistical, meteorological, and linguistic publications; then we noticed instruments by Ardwedsson and Ekman for measuring the currents of the sea, taking up water for examination from different depths, &c. Another room contained maps and manuals of geography as used in Swedish schools, and which, I was told, are sold at exceedingly low prices in Sweden.

The commissioners at the Congress for England were Lord Aberdare, Sir A. H. Layard, G.C.B., and J. Ball, Esq., F.R.S.; for the Government of India and the India Office, Sir H. L. Thuillier, C.S.I., Colonel Haig, R.E., and myself; and for Victoria, the Hon. Howard Spensley.

Colonel Haig and I arranged the English and Indian exhibits, as, with the exception of Sir Henry Layard, the other commissioners did not arrive at Venice till just before the Congress.

The Congress opened on the 15th September; the ceremony took place in the Sala dei Pregadi of the Ducal Palace. The King, Queen, Prince of Naples, and Duke of Aosta were present, and were received with much enthusiasm. M. de Lesseps, as president of the second Geographical Congress, began the proceedings by a speech in which he paid a tribute to Admiral de La Roncière le Noury, recalling his services to geography, and the loss science had sustained by his death. He then gave a sketch of the previous Congress, and a history of geographical discovery from the time of the Greeks and Romans to the present day, and dwelt on the services rendered to it by Italians, and especially Venetians. The nineteenth century, he said, was remarkable for the great development of international relations; travellers now-a-days described and traced routes of commerce, in the interests of civilisation and humanity, instead of occupying themselves as formerly with mysterious curiosities. He maintained that the object of a Congress was to bring together men of the same speciality, but of different nationality, to discuss questions of general interest, and concluded by appealing to Europe, through those present, to assist Lieut. de Brazza, who is now engaged in Central Africa in exploring the Congo, and said he was deficient in funds. He then handed over the presidency to Prince Teano, who spoke, congratulating the Congress and Venice, on the presence of royalty, and expressed the gratitude of the Congress to Venice for the hospitable reception accorded to it: he then followed with a very eloquent exposition of the great value of geographical science in uniting nations and promoting civilisation. The Syndic of Venice replied in a most eloquent speech, and the first meeting practically ended.

The real work of the Congress commenced on the morning of the 16th September, when the sectional meetings of each of the eight groups were proceeded with simultaneously. The eight rooms in which these meetings were held were on the ground floor of the Royal Palace, and all close together. I could only attend the meetings of Group I., and even to some of these it was impossible to go, as jury meetings and other work had to be looked after. It appeared to me that the arrangements for this portion of the Congress were not so satisfactory as could have been wished. The hours at which the sectional meetings were held were sometimes altered on very short notice, and without proper provision for informing the members; these jury meetings should not have interfered with sectional meetings; and again, the delegates serving on the jury meetings should have been kept *au fait* of all that was to be done, and where they were to meet. In returning from Venice I visited the Electric Exhibition at Paris, and could not help contrasting the arrangements there. At Paris each nation seemed to have its own small office in the Exhibition building, where every notice regarding jury meetings, &c. emanating from the general secretary's office, was placed in a prominent position. Then at Venice there were no short-hand reporters at these group meetings; so that with the exception of the *précis* of the "Procès-verbal" read at the General Meetings we were ignorant of what was going on at those meetings which we could not attend.

The British Association has an organisation which the Geographical Congress might in future follow with great advantage.

As regards the meetings of Group I: on the 16th September a paper was read on the necessity for establishing periodic lines of levelling of precision and for a fundamental zero of reference for Europe. The work in the Survey of India Department (tidal and levelling operations), of which I have had charge for several years past, afforded an excellent example of the subject under discussion, and I pointed out to the Meeting that the whole subject of tidal observations, and their reduction by harmonic analysis, had been considered for many years by a strong committee of the British Association under the presidency of Sir William Thomson, and that they had long since adopted the method proposed by Sir William Thomson; in this analysis the determination of mean level of the sea enters. The Meeting was also informed of the great length of country traversed by lines of first-class levelling in India, and of the great precision of these operations. On the following day, at the meeting of this group, a paper was read, and a discussion arose, on a proposal to have an international committee to arrange for the determination of longitude of certain selected stations, by electric telegraph, and its extension to India and Australia. Being the only representative of the Survey of India present, I thought it my duty to explain that a fundamental longitude had already been established in India by connection with Greenwich in the way proposed, and that the system was now being actively carried out in India, and was to be extended to Burmah. I referred also to the idiometer, invented by Colonel Campbell of the Indian Survey, for the determination of personal error, which formed part of the proposals in the paper which had been read. Colonel Ferrero (chief of the Topographical Bureau of Italy), the president of the group, spoke in reply, and said it was unfortunate that the geodetical institutions and geographical societies in Europe were not kept better acquainted with all that was going on in the great work of the Indian Survey Department.

At the third meeting of Group I., Colonel Ferrero read a paper by Signor Schiapparelli "On Local Attraction and the Deviation of the Plumb Line in North Italy." Mr. Ball, one of the English commissioners, said the calculations from which the accounts of the local attraction were derived seemed to be based on the assumption that the true figure of the earth was an ellipsoid, whereas this is precisely the one point which is rendered doubtful by recent observations. If we accept the conclusions drawn by Darwin in his remarkable investigations as to the effect of internal tides in the interior of a partly viscous planetary mass causing a change in the position of the earth, we must conclude that in all probability the form of the external crust can be only slowly and incompletely adapted to the form of a true ellipsoid.

As stated before, a short *résumé* of the proceedings of each group was read at the General Meetings which took place every alternate day during the sitting of the Congress. In addition to those of Group I., already mentioned, the following resolutions formulated by the groups are perhaps all that need be given as of special interest regarding the group meetings.

In Group I. "The Congress desires the International Geodetic Association to extend the field of their researches on the study of the earth's crust by repeating 'lines of levelling of precision' periodically. It is intended that the choice of the lines of levels, their re-levelling, and the interval of time which ought to elapse between the levelling and re-levelling, ought to be determined by the International Geodetic Association as being the most competent to judge in the matter."

In Group II. "The Congress insists particularly, regarding signals at sea, on the resolutions formerly arrived at both at Antwerp and Paris, and seeing the importance of the question they hope that they will be put in execution as soon as possible."

In Group III. "Considering the reciprocal assistance which geology and geodesy may be able to render in the progress of science, the Geographical Congress vote that the International Geodetical Commission should take into account, in their studies, the oscillations of the soil."

In Group IV. "The Geographical Congress begs the Minister of Public Instruction to order the preparation of drawings of the Megalithic monuments existing in Italy, as well as of those in the islands, and hopes that they may be carefully collected and republished in the acts of the Congress."

Also, "The Geographical Congress heard the account of Cav. St. de Stefani on the disputed subject of the singular figures found at S. Anna d'Alfaedo, and vote that the Minister of Public Instruction cause the place to be systematically excavated in order to know the way the objects are laid."

The first General Meeting took place on the 17th September. Dr. Nachtigal, having been elected President for the day, gave an excellent address, and then called on General Türr to give an account of his projected canal through the Isthmus of Corinth, which he did at considerable length; it was received with enthusiastic applause.

M. de Lesseps then addressed the Meeting regarding the Suez Canal, and how Signor Paleocapa, the eminent Italian engineer, had helped him.

At the next General Meeting, under the presidency of Senhor Coello, a long and animated debate arose on the proposal sent up from Group VI., that Geographical Societies should be divided into commercial and scientific societies, or at least that to each Geographical Society there should be a section specially constituted to deal with commercial experiments: the question was eventually sent back for reconsideration.

At the third General Meeting held on the 21st September (the President of the Geographical Society of Antwerp being in the chair), the proceedings began by the President reading the telegraphic reply of the King of the Belgians to the vote of thanks passed by the Congress. Lieutenant Massari, the companion of Matteucci, read an account of their important journey in Central Africa, during which, in passing through Darfur and Waday, they followed a route from Abeshr further south than that of Dr. Nachtigal: it would be too long even to give a very short *résumé* of this paper, or even of the description of Kano, a town containing over 50,000 inhabitants; six points had been determined astronomically, five of which were new: thermometrical and barometrical observations were taken regularly. Signor Massari referred to the assistance rendered to him and his companion by the English factories on the Niger, and especially to the kindness of Mr. David Mackintosh; and concluded by proposing a vote of thanks to the African Trading Company, of which Mr. Mackintosh is the agent, for the assistance given to them as distressed travellers, and to Prince Borghese, who bore the expenses of the expedition. Signor Massari's account was received most enthusiastically.

The Congress closed on the 22nd in the presence of a numerous and distinguished assembly under the presidency of the Duke of Genoa. H.R.H. returned thanks for the honour done him by the Congress in electing him to the presidential chair; he regretted his inability to be present sooner; he had made every effort to arrive in time for the opening of the Congress, but wind, weather, and the long distance he had to come were against him. Dr. Schweinfurth, speaking in German, addressed the assembly; he bore testimony to the care and impartiality of the members of the jury, after which a list of the awards was read; he mentioned that Portugal was not represented at the Congress, but nevertheless he was happy to announce that a medal had been voted to the illustrious Portuguese traveller, who was present, viz. Major Serpa Pinto. Various complimentary speeches followed, and then Lord Aberdare, speaking in French, expressed the thanks of all foreign Geographical Societies to Prince Teano for the admirable tact, courtesy, and devotion with which he had filled the onerous position of President. Prince Teano returned thanks, and hoped all the members present might meet five years hence to record the fresh progress of science. He then declared the Congress closed.

The following were the awards made at the Congress, in which England or her dependencies are interested:—

Class I. Letters of Distinction to the Ordnance Survey, and to the Survey of India.
Medal of First Class to Col. Haig.
„ II. Letter of Distinction to the Admiralty.
Diploma of Honour to the Survey of India (for Tidal Operations).
„ „ Marine Survey of India.
Medal of First Class to Capt. A. W. Baird, R.E.
„ III. Letters of Distinction to the Geological Commission of Canada, and to the Minister of Public Works of Victoria (Australia).
„ IV. Letter of Distinction to the Office of the Principal Secretary for the Colony of Victoria (Australia).
Honourable Mention to Robert Needham Cust, Esq.
„ V. Medal of the First Class to Dr. Hunter, of the Indian Civil Service, for the 'Gazetteer of India.'
„ VIII. A Medal of the First Class also A Medal of the Second Class } To be awarded by General Walker, R.E., Surveyor-General of India, to the native explorers he considers most deserving.
And a Letter of Distinction to the Survey of India.

PROCEEDINGS OF FOREIGN SOCIETIES.

Geographical Society of Paris.—October 21st, 1881: Colonel F. Perrier, of the Institute, President of the Central Commission, in the Chair.—This being the opening meeting of the session, the evening was chiefly occupied with the reading of the correspondence received during the vacation.—A memorandum was first read, embodying various particulars respecting the diamond mines of Griqualand West.—M. Maunoir the General Secretary, afterwards read two letters from M. Ledoulx, French Consul at Zanzibar, in the first of which he announces the arrival of Mr. Joseph Thomson, and his departure to the Rovuma district on the expedition described in our November number.* He also states that Mr. Thomson is afterwards to visit the rich and little-known region between Kilima-njaro and the sea, and extending from Melindi, on the north, to the Pangani on the south, where he expects to make important mineralogical and botanical discoveries. In his second letter M. Ledoulx notifies the Foreign Minister of the death of Captain Popelin, leader of one of the Belgian expeditions, and also of the rumoured murder (since confirmed) of three Algerian missionaries belonging to the Urundi station, near the north end of Lake Tanganyika; and he also reported that communication with the interior was in a precarious state, as, owing to famine and civil war, the road swarmed with robbers, who had murdered five couriers despatched to the Karema station.—A letter was read from the French Consul at Lisbon, communicating some news of Mr. H. M. Stanley, on the authority of a local journal, and also of M. de Brazza. He says that the latter has struck a mortal blow at slavery in West Africa, and that already the natives, who look upon him as the apostle of liberty, flock to him in large numbers demanding their freedom.—Another letter read was one written from the Eguerie plateau, on January 26th, and addressed to Sub-Lieutenant Brosselard, by Captain Masson, who was murdered with Colonel Flatters, on February 16th, in which he gave some particulars of the movements of the expedition from November 18th, 1880.—The next communication detailed the movements of M. Alphonse Pinart,† who returned to America in November 1880. He spent four months at Porto Rico, and was able to examine the island in detail and collect a quantity of paintings and hieroglyphic inscriptions of the ancient inhabitants. He afterwards visited San Domingo and then Havana, where he found in the public archives some documents of the highest interest for the elucidation of the geographical discoveries of the last century in the Rocky Mountains, and among others the journal of the French Canadian, Jacques Leglise, who discovered the sources of the Missouri. From Havana he set out for the Sierra Gorda and the ancient missions of the Rio Verde, intending afterwards to visit Lake Peten, in Northern Guatemala, and to return to the Antilles in the spring.—An interesting statement was then read to the Meeting regarding the excursion of MM. Bonvalot and Capus from Samarkand to the Amu-daria, of which an account is given in our Geographical Notes this month.—A note was read respecting the altitudes in Montenegro determined by M. Borshansky, and the general configuration of that mountainous region.—The Chairman then gave a sketch of the proceedings of the International Congress of Geography at Venice, and on his proposition votes of thanks were unanimously passed to the Italian Geographical Society and the Municipality of Venice for their courteous reception of the members of the Society, among whom were MM. de Quatrefages, Maunoir, Hamy, Daubrée, d'Abbadie, &c.—M. Germond de Lavigne communicated to the Meeting two letters which had been addressed to him by a member of the expedition recently sent to Mozambique to inquire into the mineral and other resources of the Zambesi basin. The gold in the region north of the river would not, it appears, pay the expenses of working, but the engineers have found large quantities of good coal on the banks of the Moatisé.—M. Dutreuil de Rhins mentioned that he had received two letters from the Abbé Desgodins, the well-known traveller in Eastern Tibet, but the late hour of the evening did not admit of his touching on the questions dealt with in them, and he undertook to prepare an abstract for the *Bulletin*.—Lastly, Mr. Charles Rabot gave a brief account of his journey in Lapland. His starting point was Mosjöen, a small port on the Atlantic, a few minutes south of the Arctic Circle, and thence he directed his course to Rösvand, the principal lake of Northern Norway, for the purpose of taking soundings. In the month of August he ascended the Sayektjokko (7000 feet), the top of which is the highest point in Scandinavia above the Arctic Circle, and was only lately discovered by a Swedish officer; and he afterwards visited the glaciers on the southern slopes of Sulitjelma. M. Rabot's last work was to make a thorough examination of the Jokulfjeld, a glacier in Norwegian Lapland, on the shore of the Arctic Ocean, which is the only glacier in Continental Europe extending down to the sea. During his journey he was able to obtain a good deal of information respecting the nomad inhabitants of the region, and to make a fairly complete collection of objects for the Musée Ethnographique.

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* See *ante*, p. 660.

† See *ante*, p. 669.

——— November 4th, 1881: Colonel F. PERRIER, of the Institute, President of the Central Commission, in the Chair.—M. Metchnikof addressed the Meeting on the subject of the vigorous impulse given to public instruction in Japan by the colleges established under European and American superintendence, and he stated that geographical science had made considerable progress in the Far East through Japanese initiative, of which a recent official publication furnishes fresh proof. M. Metchnikof referred to a description of the empire of the Mikado, which is divided into nine departments and is further sub-divided into provinces. The work in question deals with statistics of the products of the country, cultivation, industries, commerce, and population, and also with history. The work contains a fund of useful and valuable information, and is accompanied by the map of Japan, drawn and engraved by Japanese, which was exhibited at the Paris Exposition.—It was announced that General Ricci had just died at Novara, at the age of sixty-nine. This event, the Chairman observed, was a great loss to the science of geodesy, and it was through General Ricci's exertions that Italy had undertaken important work in the departments of geodesy, topography, and cartography. The creation of the Italian Military Topographical Institute was entirely due to his initiative, and from it proceeded the map of the Kingdom of Italy, which was so much admired at the Venice Congress.—Among the items of geographical news communicated to the Meeting, it was stated that Dr. Crevaux was preparing to start again for South America, with the intention of ascending one of the affluents of the Plata, to the water-parting of the Marañon basin, and of returning to the sea by the latter river.—Reference was made to the departure of Lieutenant Delaporte to renew his archæological explorations in Cambodia, and also to M. Ujfalvy's work in Central Asia.—A telegram was read confirming the news of the loss of M. Sibiriakof's vessels, the *Oscar Dickson* and the *Nordland*, the former of which was crushed by the ice and foundered on August 2nd. The crews were all saved, and were to return through Siberia.—A brief sketch was also given of Captain Adams' whaling voyage in the *Arctic*.—Dr. Montano afterwards read a paper on a journey in company with Dr. Paul Rey, in pursuance of instructions which he had received two years ago from the Minister of Public Instruction to explore certain islands of the Philippine Archipelago. M. Rey's particular department was natural history (geology, zoology, &c.), while M. Montano was more especially occupied with anthropological observations. In the course of the journey the Island of Sulu and the eastern portion of Mindanao were thoroughly explored. An opportunity was also made use of to visit Sandakan Bay, in Northern Borneo.* The collections made by the expedition have been deposited in the Muséum d'Histoire Naturelle, and include 170 anthropological sets of observations, photographs, several complete skeletons, more than 200 skulls, and numerous specimens of animals, among which are two new species of birds and five of fishes.

——— November 18th, 1881: Colonel F. Perrier, of the Institute, President of the Central Commission, in the Chair.—It was announced that, as a souvenir of the third International Congress of Geography, held at Venice in September, the Municipality of that town had presented to the Society one of the commemorative medals which they had caused to be struck, bearing effigies of Nicolo and Antonio Zeno, the famous Venetian travellers; and had also forwarded a 'Guide to Venice,' prepared by Signors Barozzi, Fulin, di Stephane, and Malmenti, and one of the Murano suburb by the Abbé V. Zanetti.—The Minister for Foreign Affairs communicated to the Society a despatch from M. Ledoulx, French Consul at Zanzibar, confirming the melancholy intelligence of the assassination of three Algerian missionaries, Pères Deniaud and Augier, and M. d'Hoop, a lay assistant, who had gone from Ujiji to Bikari, some 75 miles further north on the shores of Lake Tanganyika. It was stated that they were attacked and murdered in consequence of differences with natives, who had taken away a child belonging to the mission.—M. Romand called the attention of the Society to the library at Kairwan, in the Regency of Tunis, and suggested that the Government should be asked to institute inquiries with a view to ascertaining whether it contained important documents relating to ancient geography and the migrations of the Arab tribes, maps, accounts of travels in the interior of Africa, &c.—A letter was read, which had been addressed to the Society by M. Guyot from Tete, on the Zambesi, furnishing a great deal of information respecting the hydrography of a portion of the river, and especially of its affluents, the Moatisé and the Moarasé, which are fed by several streams, of which he gave the names. In describing the nature of the soil, he mentioned a considerable mass of diorite as well as oil-bearing tracts, already pointed out by the late Mr. Richard Thornton. On the banks of the Moarasé there are numerous villages where hospitality is requited by a present of a few yards of cotton cloth. The country is exceedingly beautiful, but about 12 miles from the Zambesi is in a very insecure state; and but for his escort of 150 men, M. Guyot would certainly have been stopped by robbers. The expedition is reported to be in good health, and a party had just started for Manica, where the ancient Portuguese travellers mention the existence of gold-mines. M. Guyot concluded his letter by stating that the Governor of Tete had informed him of the formation at Mozambique of a new Geographical Society which is to render great services to science and its pioneers in the vast basin of the Zambesi.—The Chairman referred to the presence at the meeting of the well-known Russian traveller, M. Veniukof, who has made several journeys in the Far East, Central Asia, Turkey in Asia, and the Caucasus. He lately published for the meeting of the Venice Congress a small *brochure* containing a list of all the Russian travellers in Asia from 1854 to 1880, with the regions visited by each. — The Chairman afterwards furnished a summary of information regarding the various official expeditions which are to be despatched to different parts of the world to observe the coming Transit of Venus.—M. Camion presented to the Society a telemeter of his own invention, which, on a cursory inspection, appeared likely to fulfil the conditions of simplicity and lightness so necessary in instruments used by explorers. A committee has been appointed to examine into its accuracy.—Lieutenant René Roy, who makes geographical work in the extreme north his special study, gave the Meeting a summary of recent news, mentioning that the Dutch expedition in the *Willem Barents* had returned to Amsterdam, that Mr. Leigh Smith in the *Eira* was probably beset by the ice in the neighbourhood of Franz-Josef Land, that the United States steamer *Alliance* had returned to Halifax without discovering any trace of the *Jeannette* after four months' search, and that the boats of the steamer *Rodgers* had proved Wrangell Land to be an island. M. René Roy insisted that the only means of reaching the North Pole would be the discovery of land by which sledge parties could advance towards it, and that Wrangell Land having been shown to be an island, all hope of reaching the pole from that quarter must be abandoned.—M. Simonin afterwards read a paper, entitled "La Marche du Centre de Population aux Etats-Unis."

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* See *ante*, p. 592.

Geographical Society of the Pacific, San Francisco.—October 10th, 1881: Mr. J. W. Winans in the Chair.—The first paper read was entitled a "Memorandum showing the relation of Plover Island to Wrangell Land," by Professor George Davidson, of the United States Coast and Geodetic Survey, President of the Society. Captain Raynor's position of Plover Cape, a low pyramidal rock, extending as a cape from the east end of Wrangell Land, was alluded to, and also the whalers' description, from their observations during the open season of 1867, of the low neck of swampy land, covered with grass, which connected what Captain Kellett called Plover Island with the east shore of Wrangell Land. Professor Davidson explained how, in his opinion, a false horizon may have misled early observers, and also why Captain Dallmann's course in the schooner *W. C. Talbot*, in 1866, when he claims to have landed on Wrangell Land, must be erroneous, because the position of his vessel, as given, crosses land, and is in direct conflict with localities reported by Captains Long, Williams, and Raynor. A letter from the Vice-President of the Geographical Society of Bremen on the subject was then read, which was not considered to afford satisfactory explanation of Captain Dallmann's claim.—The next paper read was by M. Berton, Swiss Consul, on the Universal Meridian proposed by M. H. Bouthillier de Beaumont, President of the Geographical Society of Geneva.

NEW BOOKS.

(By E. C. Rye, *Librarian* R.G.S.)

EUROPE.

Venice.—Saggio di Cartografia della Regione Veneta. Venezia: 1881, large 8vo., pp. 444. (*Dulau:* price 1*l.* 2*s.* 6*d.*)

Dedicated to the Third International Geographical Congress recently held at Venice, this work forms vol. vi. of the Historical Monuments published by the Venetian Royal Commission of National History (or vol. i. of the 4th series, Miscellanea). It consists of an elaborate account of the Cartography of Venetia, prepared under the direction of Prof. G. Marinelli by 16 distinguished Italian authorities, who have divided the various provinces between them. 453 MSS. (beginning with the 11th century), and 1743 printed and engraved maps (commencing with the 15th century), are described; and the Index gives both names of places and (separately) of authors and artists.

ASIA.

Bock, Carl.—Reis in Oost- en Zuid-Borneo, van Koetei naar Banjermassin, ondernomen op Last der Indische Regeering in 1879 en 1880. Met historische Inleiding over Koetei en de Betrekkingen van dit Leenrijk tot de Regeering van Nederlandsch-Indie, door P. J. B. C. Robidé Van der Aa. s'Gravenhage (Martinus Nijhoff): 1881, 4to. Atlas of plates and map separate. (*Dulau:* price 16*s.*).

The English translation is noticed *infrà.* The original work wants the general map, but possesses a smaller one of the Jempang and Semajang lake-region.

——— The Head-hunters of Borneo: a Narrative of Travel up the Mahakkam and down the Barito; also Journeyings in Sumatra. London (Sampson Low & Co.): 1881, roy. 8vo., pp. i.–xvi., and 344, map, coloured plates, and woodcuts. Price 1*l.* 16*s.*

Mr. Bock was sent early in 1878 by the late Marquis of Tweeddale to collect birds in Sumatra. He is styled "Late Commissioner for the Dutch Government" on the title-page of his book, the justification for which is a statement in the preface that he was entrusted by H.E. Mr. Van Lansberge, Governor-General of the Dutch East Indies, with a mission to Koti to report on the native races of the interior, &c., and to cross the island, if possible, either to Pontianak or Banjermassin.

The book commences with his account of his journeys in South-eastern Borneo, the prior work in Sumatra (which is of no geographical interest) being discussed at the end.

The Borneo portion may be briefly summarised:—Arriving at the delta of the Mahakkam, Mr. Bock, after a short stay at Samarinda (a very miserable town) and Tangaroeng, ascended the river to the junction of the Telén, which was followed to Moara Tjalong. The Klintjow was then ascended past Long Vai (where some stay was made) into the country of the Poonans, and the return made down the river to Pelaroeng. After a sea trip in the Sultan of Koti's yacht to the northern boundary of Dutch Borneo on the east, Mr. Bock again ascended the Mahakkam, passing the Telén junction, and following the main stream and its tributaries to the west, through Lakes Semajang and Jempang to Moara Pahou, the furthest Malay settlement in Koti, all beyond being Dyak country. From this point he turned south-west down the Pahou and Lawa rivers to the upper waters of the Benangan, reaching the Barito at Loetontoer by the Teweh. In this part of his journey he mentions (p. 144) statements referring to a race of people near Long Puti with caudal appendages, the "Orang-boentoet," in terms suggesting a belief on his own part in their existence. An expedition was despatched in search of this "great physiological prize, the missing link in the chain of evidence proving the descent of man from monkey," which would almost justify an inversion of the title of the book, as no new experience of head-hunters is recorded in it.

Mr. Bock followed the Barito in its southern course past the military station of Boentoek to Banjermassin, and after some stay there ascended the Nagara to Amoentai, thence reaching Mindai in the hills.

The work is mainly of interest as containing material available for ethnological discussion, which apparently the author chiefly had in view. The plates and woodcuts, for the most part very well executed, represent various individual peculiarities, tattoo marks, utensils, weapons, idols, &c., and buildings; one forest scene, crossing the river Benangan (p. 154), may especially be noted. The map (scale 38 miles to the inch) shows the extent of Mr. Bock's journeys.

An Appendix contains a discussion of Dyak arrow poison, a list of land and fresh-water *Mollusca* from Sumatra and Borneo, with descriptions of new species; a list of birds from the highlands of the west coast of Sumatra; a vocabulary of the Long Vai Dyak dialect, and a list of Sumatra diurnal *Lepidoptera.*

AFRICA.

Alvarez, F.—Narrative of the Portuguese Embassy to Abyssinia during the years 1520–1527. By Father Francisco Alvarez. Translated from the Portuguese, and edited, with Notes and an Introduction, by Lord Stanley of Alderley. London: printed for the Hakluyt Society (Richards, 37 Great Queen Street, W.C.): 1881, 8vo., pp. i.–xxviii. and 416, map.

Forms No. LXIV. of the Works issued by the Hakluyt Society, and is translated from the original black-letter edition of 1540, by Louis Rodriguez. Most former translations of this, the earliest work extant on Abyssinia, are considerably abridged, the only English one being in Purchas; and the coincidences between certain parts of Johnson's 'Rasselas' and Alvarez's narrative is explained by the fact that Johnson's first literary work was a translation of 'Lobo's Voyage to Abyssinia.'

The map, compiled by Mr. C. R. Markham, shows a part of Abyssinia, from Massowa to Ankober, scale 30 miles to the inch.

Cosson, E.—Compendium Floræ Atlanticæ, seu Expositio methodica plantarum omnium in Algeria necnon in regno Tunetano et imperio Maroccano hucusque notarum: ou, Flore des États Barbaresques, Algérie, Tunisie et Maroc. Vol. I., Première partie—Historique et Géographie. Paris (Imprimerie Nationale): 1881, 8vo., pp. 265, maps. (*Williams & Norgate:* price 12*s.* 6*d.*)

This introductory portion contains a notice of all the voyages and explorations which have most contributed to a knowledge of the Botany of the regions named in the title, being in fact a series of biographical sketches of North African travellers, in some instances sufficiently long to admit of topographical detail. The geographical portion consists of an alphabetically arranged descriptive list of the chief localities mentioned in the body of the work, with the Arab and Kabyle words which enter most frequently into the composition of the names of places. The geographical position, altitude, and ancient name are indicated in each case: this part occupies 119 pages, and is of considerable topographical value for Gazetteer purposes. This is followed by an indication of the principal sources, maps, itineraries, books, periodicals, &c., consulted for the work, divided by regions; a note on the division of Algeria into natural districts, with their limits and characters; an enumeration of the chief localities explored in Algeria, with the names of their explorers, &c.

The maps are:—1, a botanical one of Algeria showing the natural divisions (scale 1:1,600,000), with inset of the Jurjura chain (scale 1:400,000); 2, the same map and inset showing the principal routes and degree of exploration.

Ensor, F. Sidney.—Incidents on a Journey through Nubia to Darfoor. London (Allen & Co.): 1881, 8vo., pp. 225, maps. Price 10*s.* 6*d.*

Mr. Ensor, a civil engineer, was engaged at the end of November 1875, in prospecting and surveying for a line of railway from Aboo Goosi to El Fâsher (in native, Tedelti), the capital of Darfoor, having already been occupied on the line of the proposed Soudan rail, on the line of which Aboo Goosi is situated, six miles higher up the Nile than Old Dongola. This new line was to be made along the Wady Milkh (or Malik), which extends in almost a straight line to Darfoor, but has hitherto been considered unsafe, owing to the predatory habits of the Arab tribes.

The route is shown on a map (scale 40 miles to the inch), and a sketch plan of El Fâsher (scale, about 400 yards to the inch) is also given. The position of this town was from careful surveys found to accord practically with that fixed by the astronomical observations of Colonel Mason.

AUSTRALASIA.

Horne, John.—A Year in Fiji, or an Inquiry into the Botanical, Agricultural, and Economical Resources of the Colony. London (Eyre & Spottiswoode): 1881, 8vo., pp. 297, map. Price 5*s*.

The author, Director of the Botanic Gardens and of Woods and Forests, Mauritius, visited the Fiji Islands at the invitation of Sir A. H. Gordon, the Governor, at whose request these notes are published. The title sufficiently indicates the scope of the work, which gives a good general account of the group. The map (scale 15 miles to the inch) shows all the islands and Mr. Horne's routes.

ARCTIC.

Baffin's Voyages.—The Voyages of William Baffin, 1612–1622. Edited, with Notes and an Introduction, by Clements R. Markham, C.B., F.R.S. London: printed for the Hakluyt Society (Richards, 37 Great Queen Street, W.C.): 1881, 8vo., pp. i.–lix., and 192. Maps and frontispiece.

Forms No. LXIII. of the works issued by the Hakluyt Society.

Mr. Markham has now for the first time collected in one volume the narratives of Baffin's five voyages in search of the north-west passage (1, in 1612, by John Gatonbe, one of his quartermasters, from Churchill, with concluding fragment by Baffin himself, from Purchas; 2, in 1613, from Purchas; 3, in 1614, by Ro. Fotherbye, from Purchas; 4, by Baffin, 1615, from the British Museum MS. and Purchas, with careful discrimination of added and omitted matter by the latter; 5, from Purchas, in 1616), adding Briggs's discourse on the probability of the passage (which quotes Cowles's story), Michael Lok's note on discoveries of Juan de Fuca, and Briggs's treatise on the north-west passage. The introduction contains a notice of the old Merchant Adventurers, who were the munificent patrons of discovery during the Elizabethan age, commencing with Sir Thomas Smith, whose portrait is reproduced by photo-sculpture; and also some interesting conjectures based upon the meagre results of searches after matter bearing on the earlier life of Baffin, and a sketch of the reason of the connection between the Biscayans and the ancient Arctic expeditions (of which more details have been during the past summer collected by Mr. Markham personally on the Biscayan coast). Particulars are also given of Baffin's last voyage to the East Indies, and of his death from a shot at Kishm, during the siege of Hormûz. This portion is illustrated by a map of the entrance of the Persian Gulf. The other maps are: a series of five illustrating the history of the delineation of Baffin's Bay, from the circumpolar chart of Luke Fox, 1635, Hexham's edition of Hondius, 1636, Moll's Atlas, 1720, Daines Barrington, 1818, and the modern charts; part of the west coast of Greenland; the west coast of Spitzbergen; and a facsimile in colour of Baffin's chart of Hudson's Strait.

The Index is classified under five different headings, as well as being given in a general way.

NEW MAPS.

(By J. Coles, *Map Curator* R.G.S.)

EUROPE.

Bird, C., B.A.—Geological Map of Yorkshire by C. Bird, B.A., late Hon. Sec. Bradford Philosophical Society. Scale 1 : 250,000 or 3·4 geographical miles to an inch. T. Brear, Publisher, Bradford, 1881.

Bomsdorff, Th. von.—Karte des Königreich Sachsen. Scale 1 : 260,000 or 3·5 geographical miles to an inch. Leipzig, Hinrichs' Verlag. 4 sheets, chromolith. Price 4*s*. (*Dulau.*)

Danish Government.—Generalstabens topographiske Kaart over Danmark. Scale 1 : 40,000 or 1·8 inches to a geographical mile. Sheets:—Helgenæs, Skanderborg, Spöring, Aarhus, Hjelm, and Kalvö. Kalchographeret og graveret ved Generalstaben. Kjöbenhavn, 1880. (*Dulau.*)

Dépôt de la Guerre, à Bruxelles.—Carte Topographique de la Belgique. Scale 1 : 20,000 or 3·6 inches to a geographical mile. Dépôt de la Guerre, à Bruxelles. Sheets:—VIII. 4, XXXIV. 3, 5, 6, XLI. 3, 5, XLII. 3, XLIII. 6, L. 5, LIII. 8, LXIII. 3, LXXI, 1, 5, 6, 7, 8, and "Table d'Assemblage." Price of each sheet, 1*s*. 9*d*. (*Dulau.*)

Hayn, C. F.—Karte der Erzdiocese Coeln. Scale 1 : 320,000 or 4·3 geographical miles to an inch. Coeln, Boisserée. Price 4*s*. (*Dulau.*)

Ministre de l'Intérieur.—Carte de France dressée par le Service Vicinal par ordre de Mr. le Ministre de l'Intérieur. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Hachette & C^{ie}, Paris, 1881. Sheets:—XIV.—18, 19, 26. XV.—20. XXI.—1. XXII.—9, 11. Price of each sheet, 7*d*. (*Dulau.*)

Petermann's 'Geographische Mittheilungen.'—Die Wasserstrassen Frankreichs. Nach der Carte de la navigation intérieure de la France, herausgegeben vom Ministerium der öffentlichen Arbeiten i. J. 1878. Scale 1 : 3,700,000 or 50·6 geographical miles to an inch.—Nebenkarten: Paris und Umgegend, Scale 1 : 1,500,000 or 20·4 geographical miles to an inch.—Flandern, Scale 1 : 1,500,000 or 20·4 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881. Tafel 19. Justus Perthes, Gotha. (*Dulau.*)

Prussian Government.—Karte des Deutschen Reiches. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Sheets:—11. Röm, 21. Hoyer, 36. Föhr, 38. Schleswig, 55. Garding, 56. Husum, 57. Rendsburg, 493. Johanngeorgenstadt. Herausgegeben von der kartogr. Abtheilung der Königl. Preuss. Landes-Aufnahme, 1881. Price 1*s*. 6*d*. each sheet. (*Dulau.*)

ORDNANCE SURVEY MAPS.

Publications issued from 1st to 30th September, 1881.

1-inch—General Maps:—

England: New Series, Sheet 318 (neighbourhood of Brighton) in outline and with contours. Price 1*s*.

Scotland: Sheet 109 (hill-shaded). Price 1*s*. 9*d*. Sheet 83 in outline and contours. Price 1*s*. 9*d*.

Ireland: Sheets Nos. 150, 151 (hill-shaded). Price 1*s*. each.

6-inch—County Maps:—

England: Cheshire: Sheet 21, 2*s.* 6*d.*, Sheet 59, 2*s.* Essex: Sheets 25, 27, 28, 30, 36, 37, 53, 54, 67, 2*s.* 6*d.* each.

Scotland: Island of Coll, (Argyllshire), Sheets 36, 50, 2*s.* 6*d.* each. Island of Coll, &c. (Argyllshire): Sheet 37, 2*s.* Island of Jura (Argyllshire): Sheets 147, 178, 2*s.* each. Islands of Islay and Jura (Argyllshire): Sheet (175 and 176), 2*s.* 6*d.* Island of Mull (Argyllshire): Sheets 38, 107, 118, 2*s.* 6*d.* each. Hebrides: North Uist (Inverness-shire): Sheet 34, 2*s.* 6*d.* Island of Skye (Inverness-shire): Sheets, 17, 49, 50, 2*s.* 6*d.* each. Ross-shire: Sheet 90, 2*s.*

25-inch—Parish Maps:—

England: **Buckingham**: Bletchley, sheets XIX.—4, 2*s.* 6*d.*, XV.—5, XX.—2, 3*s.* each; XIV.—16, XV.—9, XX.—1, 3*s.* 6*d.* each; XV.—13, 4*s.*; XV.—14, 4*s.* 6*d.*; XV.—10, 5*s.*; Area Book 1*s.* Bow Brickhill, sheets XV.—16, 2*s.* 6*d.*; XV.—12, 3*s.*; XV.—7, 8, 11, 15, 3*s.* 6*d.* each; XV.—6, 4*s.*; XV.—14, 4*s.* 6*d.*; XV.—10, 5*s.*; Area Book 1*s.* Bradwell, sheets X.—13, 3*s.*; IX.—16, 3*s.* 6*d.*; IX.—8, 4*s.*; IX.—12, 6*s.* Great Brickhill, sheets XX.—3, 4, 8, 2*s.* 6*d.* each; XX.—2, 10, 11, 3*s.* each; XV.—15, XX.—6, 3*s.* 6*d.* each; XX.—7, 4*s.*; XV.—14, 4*s.* 6*d.*; Area Book 1*s.* Lillingstone Lovell, sheets VIII.—8, 12, 16, 2*s.* 6*d.*; VIII.—7, 3*s.*; VIII.—15, 3*s.* 6*d.*; VIII.—11, 4*s.*; Area Book 1*s.* Little Brickhill, sheets XV.—16, XX.—3, 4, 2*s.* 6*d.* each; XV.—15, 3*s.* 6*d.*; XV.—14, 4*s.* 6*d.*; XV.—10, 5*s.*; Area Book 1*s.* Mursley, sheets XIX.—3, 4, 7, 8, 15, 16, XX.—5, 2*s.* 6*d.* each; XIV.—16, XIX.—11, 12, XX.—1, 3*s.* 6*d.* each; Area Book 1*s.* Newton Longville, sheets XIX.—4, XX.—5, 2*s.* 6*d.* each; XX.—2, 3*s.*; XIV.—16, XX.—1, 3*s.* 6*d.* each; XV.—13, 4*s.*; Area Book 1*s.* Tattenhoe, sheets XIV.—12, 16, XV.—9, 3*s.* 6*d.* each; XV.—13, 4*s.*; Area Book 1*s.* Turweston, sheets VII.—15, XII.—2, 6, 2*s.* 6*d.* each; XII.—3, 4, 3*s.* 6*d.* each; XII.—7, 4*s.*; Area Book 1*s.* **Oxford**: Shipton-under-Wynchwood (Det.), sheets XXV.—10, 11, 12, XXVI.—9, 2*s.* 6*d.* each; XXV.—7, XXVI.—5, 3*s.* each; XXV.—8, 3*s.* 6*d.*; Area Book 1*s.* Spelsbury, sheets XXI.—5, 6, 9, 10, 13, 14, XXVI.—2, 2*s.* 6*d.* each; XX.—3, 4, 3*s.* each; XIV.—15, 16, XX.—8, 12, XXI.—1, 3*s.* 6*d.* each; Area Book 1*s.* **Stafford**: Bradley-in-the-Moors, sheets XIX.—16, 2*s.* 6*d.*; XIX.—12, XXVI.—1, 3*s.* 6*d.* each; XX.—13, 4*s.*; Area Book 1*s.* Ellenhall, sheets XXXVI.—7, 3*s.* 6*d.*; XXIX.—15, 16, XXXVI.—3, 4, 8, 4*s.* each; Area Book 1*s.* **Wilts**: Rollestone, sheets LIII.—16, LIV.—5, 6, 9, 10, 2*s.* 6*d.* each; LIII.—12, 3*s.* 6*d.*; Area Book 1*s.* South Newton (Det.), sheets LXV.—8, 12, 2*s.* 6*d.* each; LXVI.—5, 4*s.*; LXVI.—9, 5*s.*; Area Book 1*s.*

Town Plans—Scale 1 : 500:—

England: Buckingham, sheets XIII. **10**—20, 25; XIII. **11**—11, 16, 21; XIII. **14**—5; 2*s.* each. Hertford, sheets XXIX. **11**—12, 13, 16, 17, 18, 19, 21, 22, 23, 24; XXIX. **15**—1, 2, 3, 4, 7, 8; 2*s.* each. Pontypool, sheets XVIII. **15**.—16, 17, 21, 22; XXIII. **3**—1, 2, 3, 6, 7, 8; 2*s.* each. Stafford, sheets XXXVII. **7**—17, 21, 22; XXXVII. **11**—1, 6, 8, 11, 13; XXXVII. **15**—3; 2*s.* each. (*Stanford, agent.*)

The plans of the under-named Parishes were in the first place published in an incomplete state, in consequence of some of the sheets containing parts of coterminous parishes which were not ready for publication. These sheets having now been published, the entries in the body of the Catalogue are to be corrected by the insertion of their numerals.

25-inch—Parish Maps:—

England:—**Monmouth**: Machen, sheet XXXII.—4; 2*s.* 6*d.* The number of sheets published is now altered to 9; it is not yet complete. **Oxford**: Lower Heyford, sheet XXII.—1; 2*s.* 6*d.* The publication of this sheet completes the plan of the Parish of Lower Heyford; the total number of sheets is now 6. Swyncombe, sheet L.—1; 2*s.* 6*d.* The publication of this sheet completes the plan of the Parish of Swyncombe; the total number of sheets is now 9. **Stafford**: Adbaston, sheets XXXV.—8, 12; 3*s*. 6*d*. each. The publication of these sheets completes the plan of the Parish of Adbaston; the total number of sheets is now 13. Eccleshall and ditto (Det., Nos. 1 and 2), sheets XXX.—13; XXXVI.—2; 3*s*. 6*d*. each. XXXVI.—3, 4; XXXVII.—1; 4*s*. each. The publication of these sheets completes the plan of the Parish of Eccleshall and ditto (Det., Nos. 1 and 2); the total number of sheets is now 45. Stone, and Sandon (Det.), sheets XXV.—9; 2*s*. 6*d*. XXX.—3, 9, 10; 3*s*. 6*d*. each. XXX.—7, 11, 12; 4*s*. each. The number of sheets published is now altered to 34, it is not yet complete. **Wilts**: Shrewton and ditto (Det., Nos. 1, 2, 3), sheets XLVII.—13; LIII.—4, 16; LIV.—2; 2*s*. 6*d*. each. LIII.—8, 12; 3*s*. 6*d*. each. The publication of these sheets completes the plan of the Parish of Shrewton and ditto (Det., Nos. 1, 2, 3); the total number of sheets is now 11. West Harnham, LXXI.—1; 2*s*. 6*d*. The publication of this sheet completes the plan of the Parish of West Harnham; the total number of sheets is now 7. Winterbourne Stoke, and Maddington (Det., Nos. 1, 2, and 3), sheets LIII.—15, 16; LIV.—6, 10; LIX.—3; 2*s*. 6*d*. each. LIII.—12; 3*s*. 6*d*. The publication of these sheets completes the plan of the Parish of Winterbourne Stoke, and Maddington (Det., Nos. 1, 2, and 3); the total number of sheets is now 12.

The zincographs of the under-named Ordnance Survey Plans having been sold out, another edition has been printed, and is now ready for sale. No revision of the original plans having taken place, these impressions are similar to those already issued to the public, except when otherwise specified.

6-inch—County Maps:—

England:—Surrey, Sheet XV., Parts of Sheets 46, 47, 49, and 50 (Co. Berks), and 6, 12, and 13 (Co. Hants) added.

25-inch—Parish Maps:—

England and Wales:—**Chester**: Bowden, sheet XVIII.—6. Malpas, Area Book. **Cumberland**: Irthington, and Brampton, sheet XVII.—7. Wetheral, and St. Cuthbert, sheet XXIV.—14. **Denbigh**: Gresford (Det., Nos. 1 and 2), and Wrexham, sheet XXIX.—5. **Derby**: Bakewell, Eyam, and Hathersage (Det., No. 1), sheet XVI.—11. Pinxton, Alfreton, and South Normanton, sheet XXXVI.—13; and **Nottingham**: Selston, and Kirby in Ashfield, sheet XXVII.—13 on one. **Durham**: Chester-le-Street, Lanchester, Witton Gilbert and ditto (Det., No. 2), sheet XIX.—3. **Essex**: Barking, Chigwell, Dagenham, and Havering-atte-Bower, sheet LXVI.—6. Blackmore, High Ongar, and Norton Mandeville, sheet LI.—12. Parts of the Parishes of Writtle and Willingale Spain added. Great Clacton, sheet XLVIII.—7. **Glamorgan**: Aberafon and Margam, sheet XXV.—13. Cadoxton Juxta Neath, and Llansamlet, sheet XXIV.—2. Cadoxton Juxta Neath, and Llantwit Juxta Neath, sheet XVI.—5. Cadoxton Juxta Neath, Cil-y-bebyll, and Llangyfelach, sheet VIII.—15. Llangyfelach, Llansamlet, and St. John, sheet XV.—13. Ystrad Dyfodwg, sheet XVIII.—9, 13. Gelligaer, sheet XIII.—9; and **Monmouth**: Bedwellty, sheet XVII.—9, on one. **Hants**: New Forest (Ex. Par.), and Ringwood and ditto (Det.), sheet LXXI.—13. Yateley, and Farnborough, sheet XIII.—5; and **Surrey**: Ash and Normandy (parts of), sheets XV.—6, 7, 11, on one. **Hertford**: Brent Pelham, and Meesden, sheet IX.—16. **Kent**: Aldington (Det., No. 6), Burmarsh, and Dymchurch, sheet LXXXII.—5. Bilsington, sheet LXXXI.—2. Parts of the Parishes of Newchurch and Ruckinge added. Boughton under Blean, and Faversham, sheet XXXIV.—10. Parts of the Parishes of Ospringe (Det., No. 2), and Preston and ditto (Det., No. 1), added. Dymchurch, sheet LXXXII.—9. Higham, Index. **Nottingham**: Mansfield, and Mansfield Woodhouse, sheet XXII.—12. **Northumberland**: Eardon, and Woodhorne (Det.), sheet LXXXI.—6. **Surrey**: Coulsdon, sheet XX.—6. Parts of the Parishes of Sanderstead and Warlingham added. Horsell and Woking, sheet XVI.—8. Shalford and St. Nicholas, sheet

XXXI.—8. Walton-on-Thames, sheet XI.—16. Parts of the Parishes of Weybridge and Byfleet added. **Sussex**: Bishopstone, East Blatchington, and Seaford, sheet LXXVIII.—12. Bolney, Cowfold, Lower Beeding, and Slaugham, sheet XXV.—7.

SCOTLAND: **Dumfries**: Lochmaben, sheet XLII.—15, **Roxburgh**: Wilton, sheet XIX.—15.

Town Plans—Scale 1 : 2500.

LONDON: sheet XXVIII.

——— Scale 1 : 500:—

ENGLAND: Appleby, sheet IX. **15**—22. Birkenhead, sheet VII. **15**—25. Hartlepool, sheet XXXII. **8**—22. Oldham, sheet XCVII. **2**—15. Oxford, sheet XXXIII. **15**—6. West Cowes (Isle of Wight), sheet XC. **2**—11.

——— 5-feet Scale:—

ENGLAND: Stockport, sheet XI.

SCOTLAND: Edinburgh, sheets XXXVIII.A, XXII., XXXI., XLV.A, XLIX.A, XXX. Revised in 1877.

Index Maps:—

Index to the County of Gloucester, scale 4 miles to 1 inch. South Wales, Index, scale 4 miles to 1 inch. England and Wales (1-inch General Map, Old Series), Index, scale 30 miles to 1 inch. (*Stanford, agent.*)

AFRICA.

Baptist Missionary Society.—Map showing the journey to Stanley Pool of H. E. Crudgington and W. H. Bentley. Scale 1 : 550,000 or 7·5 geographical miles to an inch. Published in the 'Missionary Herald,' Aug. 1881. Yates & Alexander, London. Price 1*d.*

Intelligence Department, War Office.—Sketch of the Ingogo Position. Surveyed by Captain Mordaunt Boyle, 3rd Batt. 60th Rifles. Scale 1 : 10,560 or 6 inches to a mile. Intelligence Department, War Office, Oct. 1881.

——— Map of the Northern parts of the Regency of Tunis and of the Province of Constantine, Algeria; taken from maps published by the Dépôt de la Guerre, Paris. Scale 1 : 411,840 or 5·6 geographical miles to an inch. Intelligence Department, War Office, Oct. 1881.

Petermann's 'Geographische Mittheilungen.'—E. Marno's Aufnahme des mittleren Bahr-el-Abiad und des Bahr-el-Serāf. September 1879 bis März 1880. Nach dem Original-Tagebuch und handschriftlichen Skizzen construirt und autographirt von Chr. Peip. Scale 1 : 500,000 or 6·8 geographical miles to an inch.—Nebenkarten: Skizze des projectirten Canals zur Verlegung der Sobat-Mündung. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Skizze der Barre im Bahr-el-Abiad vom 7–15 December 1880, durchbrochen von E. Marno. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Skizze des projectirten Canals zur Verlegung der Mündung des Bahr-el-Gebel. Scale 1 : 100,000 or 1·3 geographical miles to an inch. Petermann's 'Geographische Mittheilungen,' 1881. Tafel 20. Justus Perthes, Gotha. (*Dulau.*)

Stecker, Dr. Anton.—Der Tana-See, aufgenommen von Dr. Anton Stecker. Scale 1 : 200,000 or 2·7 geographical miles to an inch. 'Mittheil. der Afrik. Ges. in Deutschland,' Bd. III. Taf. 1. Richard Kiepert red. Autogr. v. W. Droysen. Druck v. H. J. Hermann in Berlin, 1881. (*Dulau.*)

Wyld, J.—Map of Tunis. Scale 1 : 1,107,532 or 15·2 geographical miles to an inch. J. Wyld, London.

AMERICA.

Muret, Ch.—Vue panoramique du Canal de Panama, d'après le relief construit par Ch. Muret sur les documents officiels, Paris, 1881. Price 3*s.* 6*d.* (*Dulau.*)

Intelligence Department, War Office.—Sketch of the Ingogo Position. Surveyed by Captain Mordaunt Boyle, 3rd Batt. 60th Rifles. Scale 1 : 10,560 or 6 inches to a mile. Intelligence Department, War Office, Oct. 1881.

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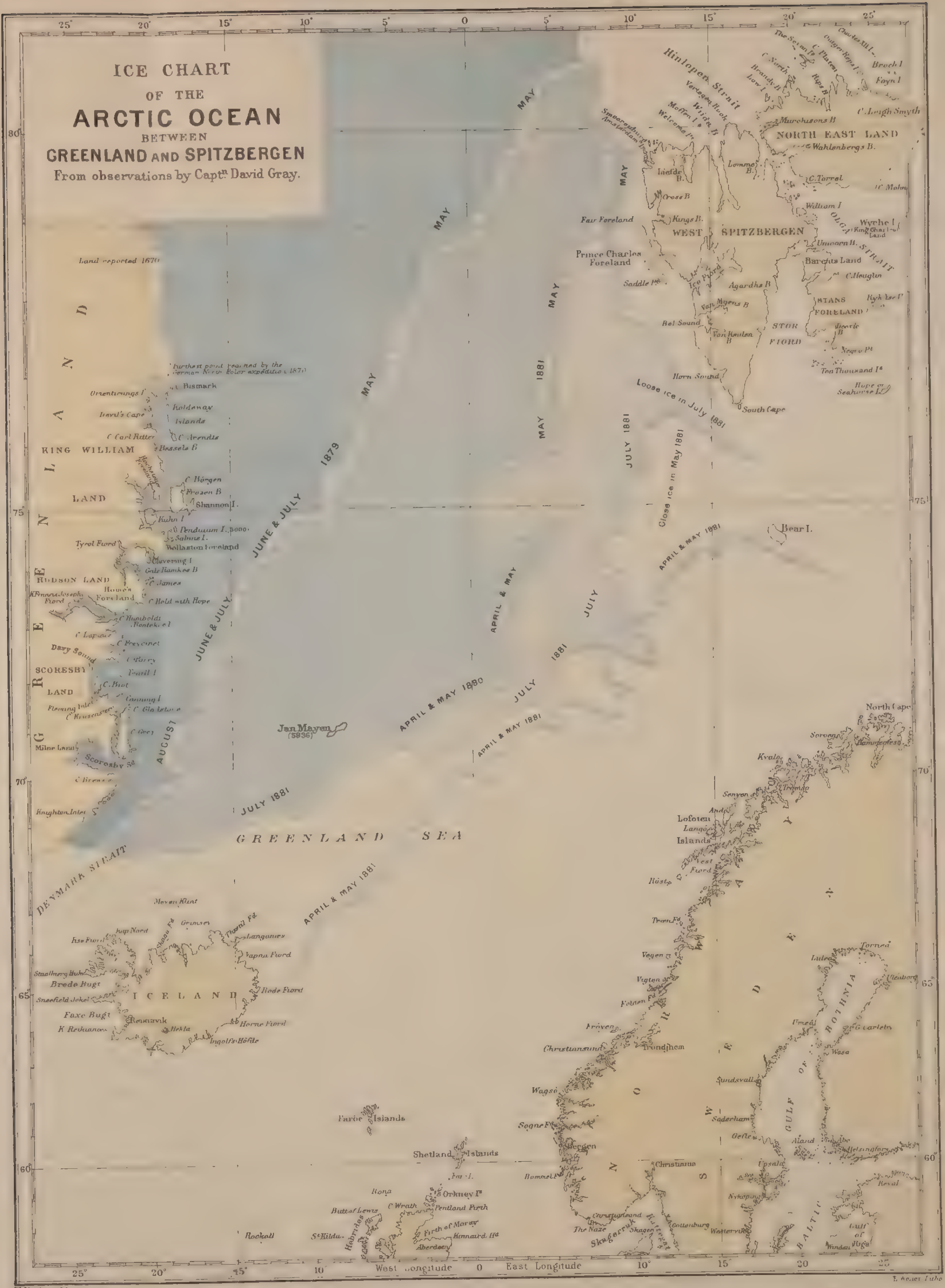
AMERICA.

Muret, Ch.—Vue panoramique du Canal de Panama, d'après le relief construit par Ch. Muret sur les documents officiels, Paris, 1881. Price 3*s.* 6*d.* (*Dulau.*)



ICE CHART OF THE ARCTIC OCEAN BETWEEN GREENLAND AND SPITZBERGEN

From observations by Captn. David Gray.

H. Sharbau del.

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